



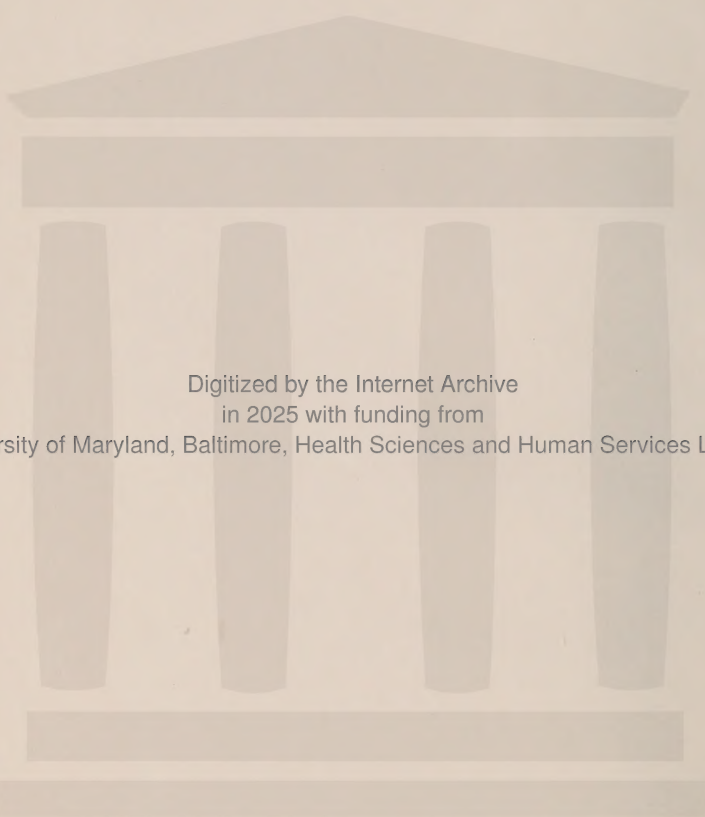


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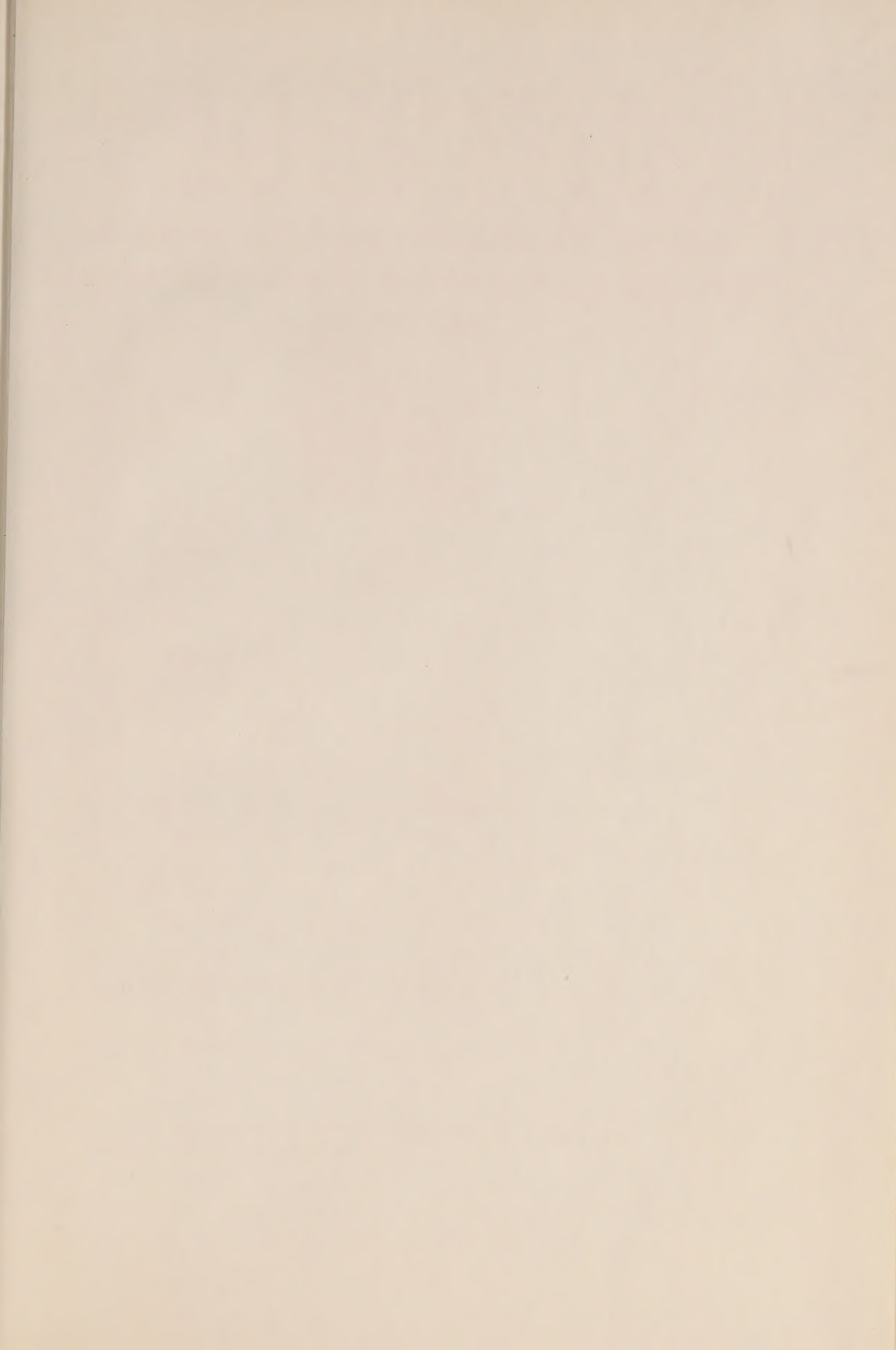






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# *The* JOURNAL *of the*

BALTIMORE COLLEGE OF DENTAL SURGERY  
DENTAL SCHOOL • UNIVERSITY OF MARYLAND



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The **JOURNAL** of the

BALTIMORE COLLEGE OF DENTAL SURGERY

DENTAL SCHOOL • UNIVERSITY OF MARYLAND

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## 1957 COMMENCEMENT ACTIVITIES

The School of Dentistry's commencement program began on Wednesday night, June 5, with the annual convocation of the Maryland Chapter of Omicron Kappa Upsilon, national honorary dental society. The twelve ranking members of the Class of 1957 were admitted to membership: Roy Christopher Page, of Campobello, S. C.; James Richard Sullivan, of Rockville, Md.; Robert Edward DeMartin, of Fairfield, Conn.; Robert Lehman Bartlett, of Baltimore; George William Greco, of Emmitsburg, Md.; Ernest Charles Merkel, Jr., of Baltimore; Kenneth Joseph Langfield, of Somerset, Mass.; Charles Benjamin Rushford, Jr., of Hinton, W. Va.; Walter Burnell Hall, of Quincy, Mass.; Roy Frank Gherardi, of Corona, N. Y.; Rafael Angel Pagan-Colon, of Barranquitas, P. R.; and William Henry Ruppert, Jr., of Baltimore.

The traditional senior awards were presented at the Senior Exercises held at the Lord Baltimore Hotel on Friday, June 7. The awards were presented by Dr. Myron S. Aisenberg:

University Gold Medal for Scholarship: Roy Christopher Page (Summa Cum Laude).

Certificates of Honor (Magna Cum Laude): James Richard Sullivan, Robert Edward DeMartin, Robert Lehman Bartlett, George William Greco, and Ernest Charles Merkel, Jr.

Alexander H. Paterson Memorial Award for Practical Set of Full Upper and Lower Dentures: William Milton Barbush, of Weirton, W. Va. Honorable Mention: Joseph Patrick Garvey, of Newport, R. I.

Isaac H. Davis Medal for Cohesive Gold Filling: Alan Stoler, of Miami, Fla. Honorable Mention: Richard Howard Warren, of Jersey City, N. J.

Alumni Association Medal for Thesis: John George Mueller, of Okmulgee, Okla. Honorable Mention: Roy Christopher Page.

Harry E. Kelsey Award for Professional Demeanor: William Henry Ruppert, Jr.

Harry E. Latcham Memorial Award for Complete Oral Operative Restoration: Ray Evan Griffin, of Barton, Vt. Honorable Mention: Kenneth Joseph Langfield.

Edgar J. Jacques Award for Meritorious Work in Practical Oral Surgery: Jimmy Ray Hager, of Hewett, W. Va.

Herbert Friedberg Memorial Award: Richard Howard Warren.

James P. McCormick Award for Outstanding Work in Oral Surgery: John Frederick Black, of Fair Lawn, N. J.

Alpha Omega Medal for Scholarship: Roy Christopher Page.

American Academy of Dental Medicine Certificate for Achievement in the Field of Dental Medicine: Robert John Stag, of Baltimore.

American Society of Dentistry for Children Certificate of Merit: Robert Lehman Bartlett, and Joseph Israel Shevenell, of Biddeford, Me.

Keys for Meritorious Work on the Mirror (student yearbook): Joseph Andre Croteau (Editor), of Chicopee Falls, Mass.; William Eugene Collier, of Camp Hill, Pa.; Bertrand Saul Dann, of Baltimore; Paul Edward Freed, of Baltimore; George





*Scenes at June Alumni Luncheon*



William Greco; Gerald Marshall Isbell, Jr., of Arlington, Va.; John Poist Keffer, Jr., of Trenton, N. J.; Roy Christopher Page; Frank Joseph Verdecchia, of Baltimore.

Keys for Membership in the Student Senate: Bertrand Saul Dann; Walter Burnell Hall; William Russell

Patteson, of Mount Hope, W. Va.; John David Vachon, of Athens, W. Va.; Frank Joseph Verdecchia.

Interfraternity Council Award for Outstanding Contributions to Student Activities (by election of the graduating class): Bertrand Saul Dann.

## JUNE ALUMNI LUNCHEON

The graduating class, their families, faculty and Alumni attended a very enjoyable alumni luncheon. Seated at the head table were the officers of the Alumni Association, Miss Katherine Toomey, Dr. Lynn L. Emmart, Dr. George M. Anderson, General Robert Mills, Dean Myron S. Aisenberg, Dr. Jacques Brun, Paris, France, Mrs. E. Benton Taylor, Mr. Herbert Brown, Board of Regents, Dr. Ernest B. Nuttall, Mr. J. Gilbert Prendergast, President of the Alumni Association of the University of Maryland, Dr. Irving Abramson, Dr. Robert W. Biddington. President Hurst greeted the class of 1957 along with their friends. He presented Dr. Myron S. Aisenberg who in turn presented the class of 1957 to Dr. Daniel E. Shehan. Dr. Shehan welcomed the new class into the Alumni Association. President Hurst introduced Mr. B. Herbert Brown of the Board of Regents of the University of Maryland who brought greetings from the Board of Regents and the University.

Dr. Hurst presented the secretary, Dr. Cappuccio to perform a special duty on behalf of the Alumni Association. He presented a certificate of appreciation from the Alumni Association to Dr. Brun for his participation in the scientific program of June

week. He thanked Dr. Brun for his contribution and the great distance he had traveled.

Dr. Hurst presented twenty-five year certificates to members of the faculty and assisting staff for their contributions to the Dental School, University of Maryland. Miss Mary A. Hagan, Miss Beatrice Marriott, Dr. William H. Hahn, Dr. Edward C. Dobbs. Dr. Lynn L. Emmart, the Alumni June week committee chairman presented fifty-year certificates to the class of 1907 who were the guests of the Alumni.

Dr. Hurst installed the new officers of the association, Dr. Daniel E. Shehan, president, Dr. Edwin G. Gail, president-elect, Dr. Joseph J. Martini, Vice president in absentia, Dr. Joseph P. Cappuccio, secretary, Dr. Howard Van Natta, treasurer, Dr. Kyrle W. Preis, editor, Dr. Milton B. Asbell, in absentia, historian-librarian.

President Shehan announced the golf tournament to be held that afternoon at Suburban Country Club. Dr. Irving Abramson, the golf chairman had made all arrangements for golf and dinner. Many golf prizes would be presented at the golf dinner.

J. P. CAPPUCCIO



## STUDENT ACTIVITIES

### Freshman Class

ON September 18, 1957 one hundred and one freshmen became an active part of the B. C. D. S. Miss Toomey was instrumental in acquiring living quarters for members of the freshman class in suburban Baltimore.

We received a formal welcome from Dean Aisenberg, and in little time members of the sophomore class were informing us that no matter how bad things may seem, they would be certain to get worse. Meanwhile the upper classmen were telling us that things weren't really so bad and the "correct attitude" was the essential criterion. About the middle of December we were forced to agree with the sophomores.

Sixteen states, Hawaii, Puerto Rico and the District of Columbia are represented, with the "Rebels" once again in the minority by 10%. Forty-six members have degrees.

President: Joseph E. Furtado, West Warwick, R. I.

Vice President: Lawrence L. Clark, Atlantic City, N. J.

Historian: William H. Lackey, Bluefield, W. Va.

Treasurer: Antone T. Oliveira, Se-konk, Mass.

Student Senate Representatives: George F. Buchness, Baltimore; Robert Siegel, Baltimore.

### Sophomore Class

After three months' rehabilitation leave for battle fatigue, the Class of 1960 returned to the front lines at B. C. D. S. to begin the campaign of Operative and Bacteriology. Casualties to date have been average, but the surgeon general's office has reported many new cases of rare soph-

omore diseases. Among the isolated cases are "shy marginitis," "crystallo-balitis," and "wax patternitis." Several people have already been hospitalized for what was diagnosed as catatonic schizophrenia but which actually turned out to be only "mis-cast fits."

In looking over the vital statistics department of the '60 class, the only significant change seems to be a sharp increase in the number of marriages. The number has increased from last year's count of thirty to forty-two. Helping to raise the percentage were J. J. Atchinson, Gene Camp, Bill Brady, Charlie Dean, Ted Noffsinger, Helmer Pearson, Tony Regine, Larry Schaefer, George Struthers, "Humpf" Fiskio and Sanford Hochman.

One of the most pleasant changes in the roster this year is Nicholas Lasijczuk. "Nick," as he prefers to be called, was born in Kolomea, Poland, a city of 35,000. He attended the grammar school and gymnasium there and also studied one year of medicine. In 1952 he received the degree of Dental Surgeon from the University of Nancy. "Nick," who is married and has one child, has been in this country for two years. His impressions of dental school and America seem to be most favorable. He feels that we are more advanced in technical and clinical skills. Surprisingly enough, with only six credits of English at Hunter College in New York, he has little trouble with the language barrier. The Class of 1960 takes great pleasure in welcoming him, and certainly appreciates the note of international dentistry he adds to our class.



### Junior Class

In September the hopeful eyes of 110 souls saw the beginning of their "white jacket" era. On the 23rd of that month 220 hands took on the long-awaited task of converting knowledge learned into an absolute clinical entity. This is the year for us to objectively start on the long, unending trail for recognition and success in our chosen profession. We have arrived at the threshold of our clinical careers, and, with our goal determined, we firmly dedicate ourselves to the task at hand.

Together with our white jackets, pig-tail explorers, and a new, controlled schedule appointment system, the year has moved successfully and swiftly along for us.

Socially, we have started off the term in full swing. The Junior dance held December 6, at the Hotel Southern, was acclaimed by all classes as most enjoyable.

President: Charles Swoope, Union, N. J.

Vice-President: Fabian Morgan, Lillington, N. C.

Secretary: Philip Smith, Brattleboro, Vt.

Treasurer: Lary Frazee, St. Petersburg, Fla.

Sergeant-At-Arms: James Dooley, Glen Burnie, Md.

Historian: Kenneth Bass, Bloomfield, Conn.

Student Senate Representatives: James McDonald, McComb, Miss.; Fred Sproule, Baltimore.

### Alpha Omega

During the week of registration in September open house was held in welcoming the members of the freshman class.

One of the largest pledge classes in the fraternity's history was initiated on October 2, 1957. The 20 new members now bring the total active membership to 70.

Socially speaking the fraternity has been extremely successful. During the second week in October was held the Freshman Mixer. October has one traditional day, that of Halloween, and on this day we found the members of the fraternity putting on their most deceptive garb for a masquerade party. In November to celebrate the arrival of the frost upon the pumpkin we journeyed to a farm near Baltimore to enjoy a barn dance.

In this Convention year members of Zeta Mu have worked diligently in conjunction with the alumni to make the 50th National Anniversary one that will be long remembered.

President: Lee Eggatz, Miami Beach, Fla.

Vice President: Stanley Block, Baltimore.

Secretary: Jay Krampf, Baltimore.

Treasurer: Carl Baumann, Miami Beach, Fla.

Assistant Treasurer: Robert Silberstein, Hollywood, Fla.

Chaplain: Peter Rubleman, Miami Beach, Fla.

Historian: Stanley Silver, Washington, D. C.

### Xi Psi Phi

In the few short months of this school year, Eta is maintaining its pace at improvement in all fields. Among our accomplishments thus far are the changes made and planned for the House. The back porch has been completely replaced thanks to the efforts of Brothers Dooley and



Fraser. Our future plans for the House include the complete redecoration of the gameroom, and other projects.

An initiation was held during our November 4 meeting. The men of Eta were pleased to welcome their new brothers to the fold. At the same meeting President Ron Bauerle was chosen to represent the men of Eta at the Xi Psi Phi National Convention in Omaha on December 28 and 29. Plans were also formulated for the annual ZIP Jazz Concert. This year the climax to the school social calendar will be held at the Lithuanian Hall on February 22. The musicians have been contacted and all is in readiness. This affair has become an annual must for all at B. C. D. S. and each year it gets bigger and better.

Our thanks to Ben LiPira, our Vice-President, for arranging the two "New Faces Parties" held in October and November, respectively. Once again everyone was delighted at the demonstration of Brother LiPira's organizing ability.

This year Eta is represented by two teams in the Student Senate Bowling league. Ben LiPira captains the team of Seniors and Jim Jabbour captains the team of Juniors. Both teams are doing well. At the present time, the Senior team is in fourth place, and the Junior team is in second place, hot on the heels of the first place team. Good luck, men, and may the pins keep falling!

The Christmas Dance held at the Stafford Hotel was indeed successful. No roll-call was needed to ascertain that the members and their ladies had a wonderful time. The post-dance party at the House was even

more of a success. The highlight of this part of the evening was an impromptu Apache dance performed by Harry Petrakis and an unknown charming young lady. Congratulations to both on a sterling performance.

At the December meeting the brothers unanimously voted to extend an invitation to honorary membership in Eta Chapter to Drs. John and Robert DeMartin. Eta Chapter is both pleased and honored to announce that both invitations were accepted. We look forward with pleasure to our future associations.

Our congratulations to Al Cura and Gerry Keen who have been elected President and Vice-President, respectively, of the Newman Club here at B. C. D. S. Our further congratulations to the following men who have become members of the Gorgas Odontological Society: Dr. Frank Dolle, Larry Frazee, Gorm Hansen, Jim Jabbour, Tony Policastro, and Cliff Warner. These men demonstrate that Eta is truly a vital and energetic chapter.

We close with the hope that we shall be seeing you at the big ZIP Jazz Concert on February 22.

### **Sigma Epsilon Delta**

With the summer far behind, the brothers of Sigma Epsilon Delta are currently engrossed in all phases of academic as well as social life. The festive houseparty season commenced with an open-house affair and was followed by a costume party which had as its theme the "roaring twenties." One of the highlights of the fall season was the wonderful dinner party given for the under-graduates by the generous and



charming wives of the alumni. We wish to express our gratitude for their warm generosity, not only for the many entertaining evenings provided by these thoughtful and hospitable women but also for the continuation of the Sunday breakfasts, two of which were held during the still infant social season.

We are all looking forward to the annual dinner-dance which is sponsored by the alumni and held in February.

Master: Lawrence Jacobs, Wilmington, Del.

Chaplain: Arnold Malhmood, Silver Spring, Md.

Scribe: Joel Pollack, New York City, N. Y.

Treasurer: Irwin Schwartz, Paterson, N. J.

Historian: Howard Schwartz, Kearny, N. J.

### Psi Omega

The first months of the school year have brought a flock of worries to the members of Psi O, but these have been dispelled, temporarily at least, by the social activities offered by the fraternity. Among these were a well-attended combo party at the House and the annual Christmas Party given by the Ladies of Psi Omega at the Edmondson Village Hall.

The Fall Initiation was held after dinner at the House of Welsh on December 4, despite the heavy snow-fall. We want to welcome the new brothers and hope they will take advantage of the opportunities that the fraternity offers in brotherhood, social activities, and leadership.

Alpha chapter has obtained the services of a cook, and home-cooked dinners are now served nightly at the

House. This is another example of the action that Psi O takes in providing for the welfare of its members.

Plans are being made for the big Variety Show to be presented this year in place of the traditional minstrel show. With the backing and participation of the brothers, it is certain to be a theatrical success.

Grand Master: Linn Tompkins, Columbia, S. C.

Junior Grand Master: Jim McDonald, McComb, Miss.

Grand Master Elect: Robert Lee, Baltimore.

Secretary: John Rushton, Silver Spring, Md.

Treasurer: Frank Trotto, Fairmont, W. Va.

### Gorgas Odontological Society

The Gorgas Society held its first meeting of the current year at the Roma Restaurant. Following the spaghetti dinner was a program presented by Dr. Kirk Hamilton and Dr. John Mueller concerning the advisability of taking an internship. Dr. Hamilton, dental resident at the University Hospital, stressed the value of the internship to a graduate who plans to go into general practice as well as to one who plans to specialize. Dr. Mueller presented information helpful to those who were undecided about an internship, to those who desired an internship but who didn't know how to judge the available opportunities, and to those among us who perhaps hadn't given the subject much consideration previously.

We wish to welcome the new Gorgas members who have been chosen from the Junior class. They may



feel justly proud of the fact that their efforts in dental school have been rewarded with the honor of Gorgas membership.

Throughout the year we hope to continue to present programs of interest and information to broaden the knowledge of the members in the different aspects of dentistry.

President: Marty Crytzer, Baltimore.

Vice President: John Rushton, Silver Spring, Md.

Secretary: Walter Leonard, Miami, Fla.

Treasurer: Philip Benzil, Baltimore.

#### **Newman Club**

The second organized year of the Newman Club at the B. C. D. S. was begun with the first monthly meeting on October 9. Rev. James McNulty, C.S.P., was the speaker; his topic was "The Mass." Father McNulty had colored slides and films as visual aids. The talk proved to be both informative and educational.

Dr. Pessagno was the speaker for the November meeting, and his talk, entitled "Don't Be", provided occasion for a great deal of thought on

the part of those present. He emphasized the points that are most often neglected by practicing dentists. It was the opinion of all those present that should we follow the advice of Dr. Pessagno, we would all, of necessity, be credits to both our profession and ourselves.

The December meeting was held on the 11th of the month. Our speaker was Mr. J. Harold Grady, Esq., the State's Attorney for the City of Baltimore. He had as his theme "Lawyer or Policeman?" This topic was an explanation of the duties of the State's Attorney's office. Many of those present were surprised to learn of the difference between an investigating body like that of the Police Department and a legal advisory office like that of the State's Attorney.

The members of the Newman Club would like to thank all those who have worked so hard to make our supper meetings possible. Without these behind-the-scenes workers, our wonderful suppers would be impossible.

A welcome invitation is extended to all to attend our monthly meetings.



## DENTAL SCHOOL TAKES PROFESSIONAL SCHOOL SOFTBALL TOURNAMENT FOR SECOND CONSECUTIVE YEAR

Last spring for the second consecutive year the Dental School, represented by its intramural champions, the Psi Omega Spikes, won the Professional School Softball Championship handily by trouncing the Pharmacy School 21-1. This victory marked the 32nd straight win for the Spikes, who have annexed the Dental School intramural honors for the last three years.

This undefeated string started way back during the 1954-55 campaign when a group of Psi Omega pledges decided to play just for the exercise. Unable to recruit enough players, the future Spikes lost their first game by forfeit to the Greene Street Tigers. Since that initial setback the Spikes have repulsed all comers and presently reign as Dental School and Professional School champions.

The team personnel has essentially been the same throughout the three years of competition. Since the first game back in the frosh year when he set down 17 batters via the strikeout route, speed-balling Bill Wolf, a 28-year-old New Britain, Conn. native, has toed the rubber in just about every Spike encounter. Wolf, an ex-Marine player, has averaged in the neighborhood of 16 strikeouts per game and posted an E. R. A. of less than a single run per contest. His three-year batting mark of .420 places him near the top of the Spike hitters.

The present infield is with one exception the same that manager Bo Menton has fielded since the opening game. Before he retired during the

junior year, big Frank Trotto capably handled the initial sack. His long-ball hitting drove in many a Spike run during that first year. Last season Ed Spinelli, from Revere, Mass., replaced Trotto at first. Spinelli, a baseball first sacker by trade, adapted well to the shorter diamond.

Bill Denison seems to have found second base to his liking after spending a year catching Wolf. Denison has played in just about all of the club's encounters.

The Spike's shortstopping is done by Bill Gannon, a West Virginian, who throughout has done the cleanup hitting with his big bat. A flawless fielder, Gannon would surely be found on anybody's all-star Dental School team. At third base was lead-off batter Linn Tompkins, the take-charge guy of the team. Although not a long-ball slugger, his clutch hits and infield leadership have paid off in the big games.

Bill Gaskill, another ex-soldier who hails from Arkansas, handles the ever dangerous job of catching Wolf. A .300 hitter, Gaskill, one of the two juniors on the squad, swings from the left side of the plate.

Somewhere in the outfield one can find versatile John Rushton, a summer sandlot player. Rushton, the best defensive gardener, has played just about every position for the Spikes.

Another irreplaceable outfielder is Bob Beckelheimer, who, along with Gaskill, has two more seasons of play remaining. Beckelheimer, after a freshman year mark of .429, hit the



ball at a .607 clip this past year to pace the hitters. His bullet-like throws have cut down many a runner on the base paths. Two other outfielders who have worn the uniform of the Spikes are dependable Rodger Zelles and Dick Georgiades. Both men have played with the club from the start. Zelles' .400 average put him near the top of the hitting ladder last spring. Graceful Georgiades led the team in circuit clouts during the first year and he always seemed to come up with the difficult catch in the clutch. Menton, who has managed the club throughout, also played in the outer pasture.

Other present seniors who have at one time or another represented the Spikes on the diamond include Don Wadsworth, Dave Watson, Mike O'Brien, Chuck Shelton and John Burton.

Any recollection of the Spikes' three years of competition must include those three battles with their bitter rivals, the since graduated "Dixiecats." In every one of those engagements the championship hung in the balance. Fine clutch pitching by the overpowering Wolf, along with timely base hits, made the difference.

This spring when the Spikes take the field for their final season of play at the dental school, they will be gunning for their fourth undefeated season and that coveted third leg of the Professional School Trophy. If this is accomplished the Psi Omega Spikes will have retired the first trophy for permanent possession for the B. C. D. S. and will end their playing days unbeaten.

## **BEST WISHES TO THE SCHOOL OF DENTISTRY AT WEST VIRGINIA UNIVERSITY**

The National Alumni Association, representing several thousand graduates of the first dental college in the world, extends its most heartily expressed good wishes to the new School of Dentistry at West Virginia. Our alumni are naturally interested in the addition of another member to the family of dental schools, but they have been especially interested in the establishment of the School at Morgantown because a fellow alumnus, Dr. J. Ben Robinson '14, has been the primary figure in its organization. The announcement of the School's opening on September 16 presented information that enlarged our recognition of the contribution that Maryland graduates have made and will make to the progress of formal dental education in West Virginia.

Providing valuable support to the well-proved abilities of Dr. Robinson, who retired as our Dean in 1953, are Dr. Kenneth V. Randolph '39, former Professor of Operative Dentistry at his alma mater, as Associate Dean and Professor of Operative Dentistry, and Dr. Elias N. Costianes, '53, Instructor in Oral Anatomy and Comparative Dental Anatomy.



## NORTH CAROLINA ALUMNI BREAKFAST

In response to a request made by Dr. Frank Hurst '27, then President of the National Alumni Association, Dr. Harold Plaster '39 made arrangements for holding an Alumni Breakfast during the 1957 session of the North Carolina Dental Society held at Pinehurst in May. The Breakfast was attended by 16 alumni, representing 14 classes. The group included two Past Presidents of the Society, Dr. Self '05 (1928) and Dr. Jackson '16 (1932), and the father-son combination of the Bakers, who graduated in 1907 and 1941.

Considering the short period allowed for preparation and the fact that the N. C. Breakfast idea was being inaugurated, the attendance was a tribute to the good effort made by Dr. Plaster. The N. C. Alumni hope to make the affair an annual occasion for reunions and reminiscences.

- 1905—I. Ruffin Self, Lincolnton.
- 1907—Luther P. Baker, Kings Mountain.
- 1916—Wilbert Jackson, Clinton.
- 1921—Charles H. Teague, Greensboro.
- 1923—John L. Ashby, Mount Airy.
- 1929—Samuel N. Shaffer, Greensboro.
- 1932—Vaiden B. Kendrick, Charlotte.
- 1934—Preston R. Taylor, Belmont.
- 1936—Marvin R. Evans, Chapel Hill.
- 1939—Harold E. Plaster, Shelby.
- 1941—Robert N. Baker, Kings Mountain.
- 1945—Boyce A. Brawley, Mooresville; Robert A. George, Mount Airy.
- 1952 — Zeno L. Edwards, Jr., Washington.
- 1953 — Charles B. Ledbetter, Raleigh; Robert R. Morrison, Raleigh.



## GIFT TO SCHOOL FROM N. J. ALUMNI

The New Jersey Alumni Association recently presented to the School a Page-Chayes handpiece. It has been placed in the Department of Crown and Bridge. This gift reflects the fine spirit of loyalty which has been consistently demonstrated by the New Jersey group.





*Alumni and Guests at Miami Breakfast*



## ALUMNI BREAKFAST

Seville Hotel, Miami Beach, Fla.

Tuesday Nov. 5, 1957

Approximately 215 alumni and friends gathered together for an alumni breakfast on Tues. Nov. 5, 1957 at 8 A.M. This group represented the second largest attendance for an alumni breakfast. The Atlantic City breakfast meeting of last year was the largest in our history.

President Shehan introduced the members and guests seated at the head table. Dr. Meyer Eggnatz, Dean Myron S. Aisenberg, Dean Frank J. Houghton, Loyola University, Dean J. Ben Robinson, W. Va. University, General Robert Mills, Miss Katherine Toomey, Dr. Lawrence W. Bimstefer, a past president of the Alumni Association, Dr. Lynn L. Emmart member of the Md. state board of dental examiners, Dr. Edward R. White, Trustee of the fourth district of the A. D. A., Dr. George W. Clendenin, member of the Md. state board of dental examiners, Dr. Daniel F. Lynch, past president of the A. D. A., Dr. Frank Hurst, immediate past president of the National Alumni Association, Dr. Edwin G. Gail, president elect of the National Alumni Association, Dr. Ernest B. Nuttall, president of the Md. State Dental Association, Dr. Joseph P. Cappuccio, secretary of the National Alumni Association.

The president gave a word of greeting to the large group at breakfast. He introduced Dr. Walter E. Green; the oldest alumnus present at the breakfast.

President Shehan called on the secretary to make a few remarks and announcements. Dr. Cappuccio intro-

duced 3 guests of the Alumni Association seated at a table in front of the head table, Mr. Glenn I. Millard of St. Paul, Minn., Mr. Joseph F. Welch, New York City, N. Y., Dr. Jose F. Polancar, Havana, Cuba.

Among those introduced were Mrs. Shehan, Mrs. Eggnatz, Mrs. Hurst, and Mrs. Cappuccio who assisted at the breakfast.

Dr. Shehan introduced the principal speaker of the morning Mr. David I. Brigham, The Director of Alumni Relations of the University of Maryland. Mr. Brigham presented one of the most outstanding talks ever delivered before an Alumni Breakfast. He explained many facets of the University and the greater Alumni Association. It was his impression that the Dental Alumni represented one of the strongest sections of the Alumni Association of the University of Maryland. Dave congratulated our group for its work in the past and for the large turnout at breakfast. He emphasized the great importance of a large Alumni to make a university strong.

Dean Emeritus Robinson was asked to make a few remarks. He was tendered a tremendous ovation by the group assembled at breakfast. Dean Myron S. Aisenberg, gave a word of greeting to the Alumni and guests and congratulated them for attending at such an early hour. President Shehan announced the Cocktail Party to be held in the Seville Hotel that evening at 7:00 P. M. This concluded a very successful and enjoyable breakfast gathering.



## COCKTAIL PARTY

### Seville Hotel

Tuesday Nov. 5, 1957

A very large group attended a most enjoyable Cocktail Party in the Seville Hotel at 7:00 P. M. on Tues. Nov. 5, 1957. Many classmates and old friends renewed old acquaintances and joined in the spirit of this festive occasion.

Dr. and Mrs. Shehan, Dr. and Mrs. Cappuccio received the guests as they arrived. It was a most enjoyable affair. Many of the comments indicated that our Alumni had enjoyed the entire day. We are all looking forward to the meeting in Dallas, Texas in 1958.

### J. P. CAPPUCCIO

1904—Walter E. Green, Baltimore.

1907—Robert H. Mills, Washington, D. C.; Richard F. Simmons, Norfolk, Va.

1910—A. L. Davenport, Baltimore.

1914—Justin C. Doore, Waban, Mass.; J. Ben Robinson, Morgantown, W. Va.

1916 — Wilbert Jackson, Clinton, N. C.

1917 — Coleman Brown, Tampa, Fla.; Frank J. Houghton, New Orleans, La.

1918 — Edwin Gail, Baltimore; Carlos M. Maristany, Ponce, P. R.

1921—Louis M. Cantor, New Haven, Conn.

1922—M. S. Aisenberg, Baltimore; John F. Clark, Baltimore; Lynn Emmart, Baltimore.

1925—Ernest Colvin, Washington, D. C.; Clifford C. Higby, Clermont, Fla.; Lewin N. Hitchcock, Westminster, Md.; Daniel F. Lynch, Washington, D. C.; Frank McCrystal, Towson, Md.; George D. Resh, Hampstead, Md.; Louis Ulanet, New-

ark, N. J.; Robert E. Williams, Goldsboro, N. C.

1926 — James H. Klock, Miami Beach, Fla.; Michael Kozubski, Baltimore; Harry Levin, Baltimore; Main E. Little, BelAir, Md.; Kenneth A. Magee, Nutley, N. J.; Ward M. Newell, St. Augustine, Fla.; William E. Trail, Frederick, Md.; Phil W. Winchester, Morganton, N. C.

1927 — James Holdstock, Tampa, Fla.; Frank Hurst, Washington, D. C.

1928—Benjamin A. Brown, Atlantic City, N. J.; Melvin Colvin, Washington, D. C.; Meyer Eggnatz, Miami Beach, Fla.; A. Harry Ostrow, Washington, D. C.

1929—G. B. Clendenin, Bethesda, Md.; Edward C. Dobbs, Baltimore; Morris C. Fancher, Manchester, Conn.; Fred Harold, New Haven, Conn.; John H. Sharpley, Baltimore.

1931 — Ernest B. Nuttall, Baltimore.

1932 — Irving Abramson, Baltimore; Charles E. Broadrup, Frederick, Md.; Jesse Englander, Bridgeport, Conn.; Arthur Fern, Hartford, Conn.

1933—Philip L. Block, Baltimore; Filbert L. Moore, Baltimore.

1934 — Lawrence W. Bimestefer, Baltimore; Ernesto Davila-Diaz, San Juan, P. R.; C. Frank Sabatino, Plainfield, N. J.; William Schunick, Baltimore.

1935—H. Chandler Bernard, Kennett Square, Pa.; Gerson A. Freedman, Baltimore; Leo Minkoff, Miami, Fla.; Gerald Shoben, Baltimore.

1936—Marvin Evans, Chapel Hill, N. C.; Alvin Greenberg, Baltimore; Otto G. Klotz, Gloucester, N. J.; John H. Shackelford, Baltimore.



1937—Simon Markos, Dover, N. H.; Boleslaw W. Miksinski, Baltimore.

1938 — Charles P. McCausland, Towson, Md.; William H. Ryan, Cumberland, Md.; Raymond M. Theodore, Hollywood, Fla.

1939—Barry B. Auerbach, Baltimore; Naomi A. Dunn, New Britain, Conn.; Verda Elizabeth James, Chicago, Ill.; Kenneth V. Randolph, Morgantown, W. Va.

1941—Robert N. Baker, Kings Mountain, N. C.

1942—Irving G. Katz, Pikesville, Md.; David Marshall, Syracuse, N. Y.; Chester B. Ralph, Perth Amboy, N. J.; Riley S. Williamson, Jr., Baltimore.

1943 (March)—John C. Carvalho, Fall River, Mass.; John W. Menius, Jr., Asheboro, N. C.; Russell P. Smith, Jr., Cambridge, Md.

1943 (November)—Lee Horwitz, Dundalk, Md.; Alfred J. Frost, Hudson Falls, N. Y.; Walter B. Stillwell, Savannah, Ga.

1944—B. Ralph Hoffman, Baltimore; Edward J. Hoffman, Baltimore; Lawrence J. Olsen, Ponce, P. R.; Francis W. Ostrowski, Webster, Mass.; Artaldo V. Quinones, San German, P. R.; Daniel A. Savini, Point Pleasant, N. J.

1945 — Arturo Benavent, Jr., Mayaguez, P. R.; Russell Gigliotti, Baltimore; John McWilliams, Deland, Fla.

1946—Charles J. Bove, Jr., Annapolis, Md.; Joseph P. Cappuccio, Baltimore; Alex Demyan, Glen Burnie, Md.; H. S. Zaytoun, Rocky Mount, N. C.

1947 — Joseph S. Bell, Hartford, Conn.; S. W. Johnson, Fort Lauderdale, Fla.; Edmond G. Vanden Bosche, Baltimore.

1948—Theresa A. Edwards, Beckley, W. Va.; Jose E. Medina, Baltimore; Harold R. Stanley, Jr., Bethesda, Md.; Albert S. Vikell, Lexington Park, Md.

1950—Francis L. Edwards, Beckley, W. Va.; Clyde Hannah, Salisbury, Md.; Robert W. Muma, College Park, Md.; Allie G. Phifer, Sumter, S. C.; B. Sargent Wells, Jr., Salisbury, Md.

1951—Simon Berenson, Portland, Maine; William Ridinger, Miami Shores, Fla.; Thomas E. Wolf, Lancaster, Pa.

1952—Morris L. Bell, Clinton, N. C.; Alvin P. Friend, Oakland, Md.; Robert Jozefiak, Bayonne, N. J.; Pilar Reguero-Caballero, Santurce, P. R.; Thomas Salimeno, Jr., Washington, D. C.; Robert C. Tesher, Hollywood, Fla.; Adrian J. Van Oss, Catonsville, Md.

1953—Alfredo H. Berguido, Panama; James A. Markwood, Rockville, Md.; Louis F. Medeiros, Cambridge, Mass.; Gustavo A. Oduber, Oranjestad, Aruba, N. W. I.; Henry W. Rucker, Leesburg, Fla.; Harvey L. Wertz, Silver Spring, Md.

1954—Thomas J. Allen, Frederick, Md.; Robert E. Bricker, St. Albans, W. Va.; John B. Ellis, Tampa, Fla.; Donald R. Gorby, Naples, Fla.; Eugene A. Leatherman, Randallstown, Md.; Franklin E. Stevens, Clark, N. J.; Kenneth H. Stoll, Arlington, Va.; Frank T. Stone, Jr., Alexandria, Va.; Raymond T. Tefft, Coconut Grove, Fla.; Frederic K. Tesher, Baltimore.

1955 — Alfred Bees, Hampstead, Md.; Thomas E. Blumenbach, Coral Gables, Fla.; Hunter A. Brinker, Jr., Ft. Meyer, Va.; William R. Cotton, Miami, Fla.; Drexel M. Johnston, Jr., Baltimore; Hervey A. Lupien,



Danielson, Conn.; Maurice G. Lusier, Manchester, N. H.; John Spencer, MacDill A. F. B., Fla.; James B. Stewart, Fernandina Beach, Fla.; Joseph F. Williams, Edenton, N. C.

1956—Armand S. Hall, Cherokee,

N. C.; Jack H. Soutar, Groton, Conn.; Donald C. Weikert, New York, N. Y.

1957—John J. DeMartin, Baltimore; Robert E. DeMartin, Baltimore; Alan Stoler, Baltimore.

### Personals

Dr. and Mrs. Murray Storch '41, of Passaic, N. J., announce the birth of a son, Michael David, on April 21.

Dr. Michael C. Meyers '54 and Dr. Barbara E. Seifert '54 were married in Baltimore on April 27.

Dr. and Mrs. Lino E. Rodriguez '52 announce the birth of a daughter, Nivia Lizzette, on March 4.

Dr. Francis J. Kihn '56 married Adrienne T. Batchelor, of Baltimore, on November 17, 1956.

Dr. and Mrs. John N. Grabner '51 announce the birth of a daughter, Margarethe Suzanne, on April 10.

Dr. Stanley Y. Inouye '51 announces the opening of his offices for the practice of orthodontics at Eleventh and L Building, Sacramento, Calif. and 3431 Fair Oaks Boulevard, Carmichael, Calif. Dr. Inouye received a certificate in orthodontics from the University of Washington and also received the degree of Master of Science in Dentistry.

Dr. Maxwell S. Golden '41 announces the removal of his office to 117 Main St., South River, N. J.

Dr. and Mrs. Maurice E. Hinds '52, of Silver Spring, Md., announce the birth of a daughter, Susan Corinne, on August 10. Mrs. Hinds is the former Jane Clark, who was for several years a technician in the Department of Anatomy. The maternal grandfather is Dr. John F. Clark '22.

Dr. Jules Millman '55 announces

his return from the United States Air Force to the general practice of dentistry at 900 Reisterstown Road, Pikesville 8, Md.

Dr. Robert B. Litton '54 announces his association with Dr. Hubert Plaster in the general practice of dentistry at the Royster Building, Shelby, N. C.

Dr. and Mrs. Ernest A. Johnson, Jr. '54, announce the birth of a son, Ernest Albert, on August 14.

Dr. and Mrs. John V. Conte '54 announce the birth of a daughter, Mary Frances, on June 28.

Dr. and Mrs. William M. Johnson '57, of Fort Myers, Fla., announce the birth of a son, William Alexander, on August 7.

Dr. and Mrs. James C. Bulger '55 announce the birth of a daughter, Elizabeth Ann, on May 26. Dr. Bulger, who completed a tour of duty with the U. S. Air Force at Mitchel A. F. B., entered the University's School of Medicine in September.

Dr. James F. Kast '55 announces the opening of his office at 5601 Fulton Rd. Ext., N. W., Canton, Ohio. Dr. Kast completed his tour of duty in the Army in June.

Dr. Joseph P. Cappuccio '46, of Baltimore, married Rocella Bentley, of Baltimore, on July 27.

Dr. and Mrs. Jules J. Levin '56 announce the birth of a son, Roger Philip, in June 1956. Dr. Levin is



in the U. S. P. H. S., assigned to the U. S. Coast Guard Academy in New London, Conn.

Dr. Harold L. Silber '55 announces the opening of his office at 2668 Morris Ave., Union, N. J. Dr. Silber was recently separated from the U. S. Air Force. He is the son of Dr. Samuel E. Silber '29.

Dr. Elmer N. Hoffman '36, of Baltimore, announces the removal of his office to the Medical Arts Building for the practice of Periodontia.

Dr. and Mrs. N. Jerome Chapin '52, of Baltimore, announce the birth of a son, David Alan, on October 13.

Dr. and Mrs. John W. Vargo '57, of Oak Hill, W. Va., announce the birth of twin sons, John Wesley and James Wilson, on November 12.

Dr. and Mrs. John F. Black '57 announce the birth of twin sons, Patrick Joseph and Michael Peter, on November 21. Dr. Black is interning at the University Hospital. Dr. Joseph H. Black '35 is a proud grandfather.

Dr. John J. Lavelle, Jr. '52, of Wilmington, Del., announces the limiting of his practice to Dentistry for

Children. Dr. Lavelle received his postgraduate training at the University of North Carolina.

Dr. Edward T. Ryan '57 announces the opening of his office at 11 Whitman St., Willimansett, Mass.

Dr. and Mrs. Charles J. Averill '52, Burlington, Vt., announce the birth of a son, James Christopher, on December 3.

Dr. R. Kent Tongue '43 (November) announces the removal of his office to 111 West Alleghany Ave., Towson 4, Md. Dr. Tongue's practice is limited to Orthodontics.

Dr. Jesse J. Greenberg '37 announces the removal of his office to 91 East Front St., Red Bank, N. J.

Dr. and Mrs. Joseph S. Mitchell, Jr. '53 announce the birth of their third son, Peter, on December 17. Grandfather Mitchell graduated from Maryland in 1914.

Dr. Paul L. Roxin '56 announces the opening of his office in the Pikesville Medical Center, 1401 Reisters-town Rd., Pikesville 8, Md. Dr. Roxin recently was separated from the Navy.

### Obituary

Dr. C. Dennis Eppright '06 (B. C. D. S.), of Mission, Texas, died on May 9. Dr. Eppright had practiced in San Antonio and Manor before going to Mission in 1917. Dr. Eppright was widely known throughout the Rio Grande Valley for his half century of capable service in his profession.

Dr. Max Morton Schwartz '23, of Jersey City, N. J., died on January 30, 1957. Dr. Schwartz was a member of Alpha Omega and the Gorgas Odontological Society.

Dr. Michael Steven Varipatis '39, of Baltimore, died on April 17. Born January 13, 1917 in Clarksburg, W. Va., Dr. Varipatis received his pre-dental training at the School of Dentistry. Following an internship at the Baltimore City Hospitals, he practiced in Essex, Md., for a year before entering the Army. Dr. Varipatis served from September, 1941 until his discharge as a Major in April, 1946, with 18 months in the European Theatre. On his return to practice, he was made Chief of Oral



Surgery and Anesthesiology of the Dental Clinic, Baltimore City Hospitals. He was a member of Psi Omega. His survivors include his wife, Mrs. Stella Klosterides Varipatis, and three sons: Stephen, Basil, and John Varipatis.

Dr. Abner T. Rowe '45, of Bethesda, Md., died on July 5. He was electrocuted by contact with a power line while fighting a forest fire which threatened his farm near Berkeley Springs, W. Va. Dr. Rowe received his preidental training at College Park, where he was a member of Lambda Chi Alpha fraternity. He had practiced in Bethesda since his separation from service in the Navy Dental Corps. Dr. Rowe is survived by his wife, Mrs. Jane Rowe, and two sons, Herbert and Rudolph, who were adopted by the Rows from a foundling home in Germany. Dr. Rowe was a member of Psi Omega.

Dr. Preston Le Roy McClain '27, of Baltimore, died on May 25. Born in Tyaskin, Md., September 30, 1903, Dr. McClain entered Maryland from Bar Harbor, Me. He was a member of Xi Psi Phi. Dr. McClain is survived by his wife, Mrs. Helen L. McClain, and a daughter, Carol Dee McClain.

Dr. Albert Earl Hennen '08 (B. C. D. S.), of Wheeling, W. Va., died on May 24. Dr. Hennen was a Past President of the Wheeling District Dental Society. Born in Palatine, W. Va., on August 21, 1882, Dr. Hennen had practiced in Wheeling during his entire career. He was a member of Psi Omega and Theta Nu Epsilon. His survivors include his wife, Mrs. Florence Kirkland Hennen; a son, Earl; and two daughters: Mrs. Atwood Haning and Mrs. Lee North.

Dr. J. Henry Hoffman '91 (U. of Md.), of Baltimore, died on July 22. Dr. Hoffman practiced in Baltimore till his retirement in 1927. During the period of his retirement from professional activities Dr. Hoffman conducted an antiques store on North Howard St. and became a well-known figure in that field. He was the brother of the late Dr. Charles S. Hoffman of the B. C. D. S. Class of 1878.

Dr. Anthony P. Laureska '31, of Baltimore, Md., died on July 26. Dr. Laureska came to Maryland from Scranton, Pa., where he attended St. Thomas College. He was a member of the Gorgas Odontological Society and Theta Nu Epsilon. His survivors include his wife, Mrs. Dorothy Woolford Laureska; a son, Timothy A.; and two sisters: Mrs. Frank Reiley and Mrs. William Duncan.

Dr. George Henry Hague '05 (U. of Md.), of Elizabeth, N. J., died on March 10, 1957. Dr. Hague was a member of Xi Psi Phi.

Dr. Edward A. O'Donnell '03 (B. M. C.), of Gardner, Mass., died on April 25, 1955.

Dr. Christopher A. Ryan '19, of Piedmont, W. Va., died on September 8. Dr. Ryan was a member of Psi Omega and the Gorgas Odontological Society. He served several terms as Secretary-Treasurer of the Potomac Valley Dental Society. His survivors include three sisters: Miss Mary Ryan and Miss Katie Ryan, of Piedmont, and Mrs. James A. Welsh, of Westernport, Md.; and a brother, John T. Ryan, of Pittsburgh.

Dr. Howard C. Yerger III '47, of Ridgewood, N. J., was killed in an airplane crash on August 21. The plane, with two other occupants, was



caught in a sudden storm and plunged into the ocean near Keansburg, N. J. Born in Bellefonte, Pa., on May 4, 1918, Dr. Yerger received his A. B. degree from Pennsylvania State College in 1942. During World War II he served in the Medical Department of the Army, 1942-44. In 1953 he was commissioned in the Army Dental Corps and assigned to the Second Armored Division, stationed at Mainz, Germany. He was a member of Phi Kappa Sigma and Psi Omega fraternities. An active participant in several aspects of community activity, Dr. Yerger was a member of the Ridgewood Committee for Fluoridation, a director of the Fairlawn Boys Club, Dental Chairman of the Regional Civil Defense organization, Concert Chairman of the Orpheus Glee Club, and a Past President of the Fairlawn Choral Society. Surviving are his wife, Mrs. Jeanne Delier Yerger; three children: Howard C., Susan, and Robert Michael; and his parents, Mr. and Mrs. Howard C. Yerger, of Wayne Township.

Dr. James Delaney '04 (U. of Md.), of Rocky Mount, N. C., died on August 15, 1956, his seventy-sixth birthday. Dr. Delaney had practiced up to a few days before his death. Born in Warsaw on August 15, 1880, Dr. Delaney attended Wake Forest College before entering Maryland. He had practiced in Warsaw and in Salisbury before removing to Rocky Mount in 1938. Dr. Delaney was a member of Psi Omega.

Dr. Benjamin Anthony Dabrowski '40, of Baltimore, Md., died on April 27. Dr. Dabrowski was born in Baltimore on January 18, 1900. He re-

ceived his B. A. degree from Johns Hopkins University in 1932. The University Gold Medal man of his class, he was a member of Psi Omega and Omicron Kappa Upsilon. He was President of his class in the senior year and Treasurer of Psi Omega. Dr. Dabrowski was affiliated with the Department of Roentgenology from shortly after graduation till the time of his death. In 1940 he was made a Fellow and in 1941 an Instructor; since 1952 he had been Associate Professor. He was Regional Director of the American Association of Oral Roentgenologists and a Past President of the Maryland Chapter of O. K. U. Dr. Dabrowski presented clinics before several meetings of the Maryland State Dental Association and before several other societies; he was an essayist at the 1947 A. D. A. meeting. He is survived by his wife, Mrs. Anna Gurbelski Dabrowski; two children: Bernard A. and Carla Ann Dabrowski; and two sisters: Mrs. Josephine Jagielski and Mrs. Pearl Spedden. On the morning of the funeral, the School was closed to permit the Faculty and the students to pay tribute to their highly regarded and greatly respected associate and teacher.

Dr. Burt B. Ide '02 (U. of Md.), of Baltimore, died on August 26. Born in Bradford, N. Y., on March 11, 1876, Dr. Ide practiced in Lockport, N. Y., before he opened his office in Baltimore in 1913. He served on the Faculty of his alma mater from 1920 to 1947. In 1924 he became Professor of Operative Dentistry and in 1947, Professor Emeritus of Operative Dentistry. Dr. Ide was the University Gold Medal Man of his class, and in his career he ful-



filled the promise indicated by his achieving that award. He was President of the Maryland State Dental Association, 1923-24, and in 1929 he was honored by being the first dentist appointed to the Maryland State Board of Health. Dr. Ide was a Fellow of the American College of Dentists and a member of Xi Psi Phi, Gorgas Odontological Society and Omicron Kappa Upsilon. He was a charter member of the Baltimore Lions Club and the Torch Club. Dr. Ide was a member of the group, representing the School and the Alumni Association, that founded this *Journal*. Dr. Ide is survived by his wife, Mrs. Mary Frederick Ide, and a daughter, Mrs. Paul Johnson. His brother, Dr. Ira C. Ide, of the Class of 1903, died in 1953.

Dr. Benjamin Sargent Wells '14 (U. of Md.), of Baltimore, Md., died on August 19. A native of Keyser, W. Va., Dr. Wells received his pre-dental training at St. John's College. He rendered a long and important term of service as a member of the Faculty of his alma mater in various capacities: as Head of the Prosthetics Clinic, the first Instructor in Roentgenology, the first Instructor in Biology, and, since 1930, Instructor in Crown and Bridge. Dr. Wells was President of the Baltimore City Dental Society (1935-36), President of the Maryland State Dental Association (1949-50), and President of the National Alumni Association. He was also a Fellow of the American College of Dentists, a charter member and Grand Master of the Oriole Chapter of Psi Omega, and a member of Omicron Kappa Upsilon and the Gorgas Odontological Society. Dr. Wells is survived by his wife,

Mrs. Thelma Everngam Wells; his mother, Mrs. Margaret B. Wells; a brother, Dr. George E. Wells; a daughter, Mrs. Martha Meekins; and a son, Dr. B. Sargent Wells, Jr., of Salisbury, Md., who is a member of the Class of 1950.

Dr. H. Hayward Streett '99 (B. C. D. S.), of Baltimore, Md., died on July 27. Born in Rocks, Md., on September 9, 1876, Dr. Streett was an outstanding leader in four areas of activity in Maryland dentistry: practice, education, organization and medico-dental relations. He was Associate Professor of Prosthetics on the Faculty of the Baltimore College of Dental Surgery, 1910-1916. From 1920 till his retirement in 1946 he was Chief of Dental Service of the Johns Hopkins Hospital. He was Past President of the Baltimore City Dental Society and of the Maryland State Dental Association (1913-14). A Fellow of the American College of Dentists, Dr. Streett was a charter member of Oriole Chapter of Psi Omega and a member of Omicron Kappa Upsilon. He presented papers and clinics before meetings of the A. D. A., the Maryland State Association and the Baltimore City Society. At the fortieth reunion of the Class of 1914, held in June 1954, he was made an honorary member of the Class in recognition of his "splendid services as a teacher" and his "many fine contributions to his profession on both the local and national levels." Dr. Streett is survived by a son, Dr. H. Baldwin Streett, and a sister, Mrs. Walter C. Michael, of Roanoke, Va.

Dr. Harry Wilbur Hicks '09 (U. of Md.) died in April, 1957. A native of Charlestown, Mass., Dr. Hicks



practiced for five years in Malden before removing to Boston, where he practiced till his retirement in 1946.

Dr. Henry John Gemski '38, of New Haven, Conn., died on October 20. Dr. Gemski specialized in oral surgery and was a member of the New England Society of Oral Surgeons. Born in New Haven on November 20, 1911, he attended Hillhouse High School and the University of Richmond. He was a member of the Parking Commission of the Town of East Haven, Past President of the Polish Business and Professional Men's Association, and Past Commander of the F. J. Stempick Post of the American Legion. Dr. Gemski served in the Navy Dental Corps during World War II. He was a member of Psi Omega. Besides his wife, Mrs. Genevieve Sigsworth Gemski, he is survived by two children, Barbara and Henry John; a brother, Joseph; and five sisters: Mrs. Alex Passick, Mrs. Edward Gross, Mrs. Arthur Pascay, Mrs. Lee Kramarczyk, and Miss Stella Gemski.

Dr. John Leo Loftus '05 (B. C. D. S.) died on November 3. A native of Boylston, Mass., where he was born on May 27, 1880, Dr. Loftus practiced in Meriden, Conn., from 1905 to 1941. In 1929 he began to practice also in Hartford. From 1941 till his retirement in 1949 he practiced only in the latter city. Following postgraduate work at New York University and the University of Toronto, Dr. Loftus began to specialize in Periodontia in 1929. He was the first Hartford dentist to specialize in that field and he was the first from Connecticut to be elected to membership in the American Academy of

Periodontology. Dr. Loftus was Past President of the New England Dental Society (1949), Past Exalted Ruler of the Meriden Lodge of Elks, a charter member of the Meriden Rotary Club, and a member of Psi Omega. He is survived by a daughter, Mrs. James Lidgate, of Worcester, Mass., and two brothers: Walter Loftus, of Worcester, and Henry Loftus, of Little Valley, N. Y.

Dr. Donald Arthur Bell '52, of Baltimore, died on July 9. Dr. Bell received his B. A. degree from Johns Hopkins University in 1948. At Hopkins he became a member of Phi Kappa Sigma fraternity. Following his graduation from Maryland, Dr. Bell served for two years in the Navy Dental Corps. He practiced in Baltimore for two years before illness forced him to give up his practice. During the few years of his professional career, Dr. Bell had indicated that he was capable of making an excellent record in dentistry. He was a member of the Gorgas Odontological Society and Psi Omega. He is survived by his parents, Vernal and Myrtle Tschudy Bell, and a sister, Mrs. John H. Howard, Jr.

Dr. Howard G. Clements '18 (B. C. D. S.), of Baltimore, died on May 7, 1955. A native of Virginia, Dr. Clements began practice in Baltimore following his graduation.

Dr. J. Walter Keagle '18 (B. C. D. S.), of Baltimore, died on November 16, 1956. He was a member of Psi Omega.

Dr. John E. Tyler '17 (B. C. D. S.), of Worcester, Mass., died on November 24. A stalwart figure in New England dentistry, Dr. Tyler was a very loyal alumnus who possessed a deep feeling of pride in his alma ma-



ter and by his noteworthy contributions to his profession constantly acted as an outstanding alumnus. A Past President of the New England Dental Society and a former Regent of the American College of Dentists, he was an enthusiastic worker in the organization of study clubs in the Worcester District Society and a leader in the establishment of dental clinics in the public schools of Worcester. During World War I Dr. Tyler served overseas in the Army Dental Corps and during World War II he was the Procurement and Assignment Officer for the dentists in his district. For several years he served as chairman of the Worcester Community Health Council, a contribution that earned for him the grateful appreciation of his fellow citizens. Dr. Tyler is survived by his wife, Mrs. Frances Slade Tyler; a daughter, Mrs. Lincoln A. Divoll, of Andover, Mass.; and four sons: John E. Jr., a member of the faculty of the University of Massachusetts, Richard J., of Bridgeport, Conn., Frank, of Worcester, and Dr. Robert

J. Tyler '54, who was associated in his father's practice.

Dr. Benjamin Pines (Pinsky) '26, of Baltimore, died on May 6, 1957. Dr. Pines was a member of Phi Alpha fraternity and the Gorgas Odontological Society.

Dr. Hebert Kuhnen '04 (U. of Md.), of Baden-Baden, Germany, died early in 1957. Dr. Kuhnen, a fine representative of his alma mater, was highly regarded in his community not only for his professional contributions to its welfare but also for his warm spirit of interest in the general activities of his fellow citizens.

Dr. Ella Cox Brazill '17 (U. of Md.), of New York, N. Y., died on June 22. She entered Maryland from Bodin, N. C., after securing her pre-dental training at Trinity College. Several years after graduation from Maryland she married a classmate, Dr. George K. Brazill, who survives her. Dr. Brazill was a member of the Gorgas Odontological Society and an honorary member of the North Carolina Dental Society.

## WASHINGTON ALUMNI BREAKFAST SCHEDULED

The Twenty-Sixth Annual Postgraduate Clinic of the District of Columbia Dental Society will be held March 9-12 at the Shoreham Hotel. In association with this meeting the District of Columbia Section of the National Alumni Association is sponsoring a Maryland Breakfast to be held in the Shoreham at 8:00 a. m. on Tuesday, March 11. Maryland hospitality quarters will be maintained in Suite 109 D.



# NEWS ABOUT OUR ALUMNI

By G. P. H. FOLEY

## L. C. Gallen '28 Honored at Commemorative Dinner

At a Commemorative Dinner held at the Baltimore Country Club on June 24, Dr. Lester C. Gallen '28, of Baltimore, was presented a scroll testifying to his fine leadership and important personal efforts in securing the passage of the Maryland Senate Bill 61. The dinner was attended and the scroll presented by the men who had worked with Dr. Gallen in support of the legislative measure, which was passed unanimously by both the House of Delegates and the Senate. Bill 61 is a permissive law allowing professional persons and civil employees to set up trusts for the purpose of obtaining low-cost group life insurance.

The scroll expresses this tribute:

"All good men pay tribute to Lester Carrington Gallen, D. D. S., in recognition of signal service to his fellow men on the occasion of the passage of Senate Bill 61 during the General Session of the Maryland State Legislature of 1957, at Annapolis.

"With devotion and dedication to a righteous cause and with impeccable spiritual confidence, his efforts symbolize the finest of human activity.

"Therefore, this token of appreciation manifests his unselfish devotion in establishing rights for others: attorneys, physicians, and dentists, together with civil servants of the political subdivisions of the Free State of Maryland."

The School of Dentistry alumni present at the Dinner were Drs. R. Kent Tongue, Jr., '43, George M. An-

derson '19, Charles E. Broadrup '32, Arthur I. Bell '19, Lynn Emmart '22, Conrad L. Inman, Sr. '15, and Ernest B. Nuttall '31. Other alumni present were Herbert H. Hubbard '50 (Law), Dr. Karl F. Mech '35 (Medicine), Charles D. Harris '33 (Law), and Paul F. Due '23 (Law).

Others present were Raymond K. Tongue, D. Worthington Pearre, Ben King, Herbert H. Grymes, Elmer F. Bernhardt, Wilbur D. Preston, Jr., Dr. Howard Smith, Edward K. Gerner, William Heinekamp, Dr. Robert C. Kimberly, George L. McDowell, State Comptroller Millard F. Tawes, and Senator Thomas F. Dempsey.

Originally from New Brunswick, N. J., Dr. Gallen has practiced in Baltimore since his graduation. He is a member of the Gorgas Odontological Society and Omicron Kappa Upsilon.

## Friedman '36 Grand Master of Sigma Epsilon Delta

Dr. Samuel Friedman '36, of Baltimore, Md., is the Grand Master of S. E. D. fraternity. He succeeded Dr. Daniel D. Schwartz '36, of Paterson, N. J. Dr. Henry E. Rostov '31 and Dr. Irving Abramson '32, both of Baltimore, are other alumni who have held the highest office in the fraternity.

## Jackson '16 Past North Carolina President

The May, 1957 issue of the *Journal of the North Carolina Dental Society* was dedicated to Dr. Wilbert Jackson, of Clinton, a member of the B. C. D. S. Class of 1916. A native of Dunn, Dr. Jackson attended Campbell College before entering dental



school. He is a Past President of the Fourth District Dental Society (1928) and of the North Carolina Dental Society (1932). For twenty-three years he represented North Carolina in the ADA House of Delegates and for fifteen years was a member of the State Board of Dental Examiners. He is a Fellow of the American College of Dentists. A devoted churchman, he has been a Ruling Elder in the Presbyterian Church for over thirty years and Superintendent of the Sunday School for nineteen years. "Through the years he has given of himself unselfishly to his fellow man and to the profession he loves so much."

#### **The Tinsleys '14 and '39 of Lynchburg**

Dr. John C. Tinsley '14 has practiced in Lynchburg, Va. since his graduation. He is a Past President of the Lynchburg Dental Society (1920) and the Piedmont Dental Society (1927). He has presented many clinics before local and district societies.

Dr. William C. Tinsley '39, his son, is also a Past President of the Lynchburg Dental Society (1948). Since 1955 he has been Parliamentarian of the Virginia State Dental Society. Dr. Tinsley has presented several clinics before meetings of the State Society. During the World War he served in the Army Dental Corps and was separated after five and a half years of active service.

#### **Gould '03—Cohesive Gold Filling Advocate**

For over fifty years Dr. Horace L. Gould '03, of Bucksport, Me., has been using the burnishing method of

inserting cohesive gold fillings. Dr. Gould claims that by the use of his method the automatic mallet can be eliminated and the work accomplished in half the time required when using the mallet. During the past forty years he has presented clinics on his method at the Harvard and Tufts Schools of Dentistry and before meetings of the A. D. A., the New England Society, and many state societies. He has also demonstrated his method in private clinics. Still a full-time practitioner at eighty-two, Dr. Gould writes, "No man ever enjoyed his life's work more than I have. There is not a morning that I am not anxious to go to my office." His two sons are also engaged in the practice of dentistry.

#### **Roca '15 and '17**

Dr. Vincente H. Roca, of Baltimore, has the distinction of having graduated from both the School of Dentistry of the University of Maryland and the Baltimore College of Dental Surgery. After receiving his degree from the University of Maryland in 1915, Dr. Roca returned to his native city of Santiago de Cuba. After a brief period of practice he returned to Baltimore with the idea of practicing in Maryland. As the Maryland Board examinations had recently been given and the next scheduled test was in the far future, Dr. Roca registered at the Baltimore College of Dental Surgery. He received his degree from that school in 1917. Recently Dr. Roca announced the removal of his office from 226 W. Madison St. to 1004 East 36th St., Baltimore 18.



### **Schunick '34 Maryland Commander of J. W. V.**

Dr. William Schunick '34, of Baltimore, is the Commander of the Maryland Department of the Jewish War Veterans of the U. S. A. Dr. Schunick is a Past Commander of the Baltimore Memorial Post. He served with the Army Air Force from 1942 to 1946, with assignments in Iceland, Scotland, England and France. Dr. Schunick has given table clinics on "Canine Dentistry" before the meetings of several local and state societies.

### **Colvin '25 President of D. C. Society**

Dr. E. Milburn Colvin '25 is President of the District of Columbia Dental Society. He was a member of the District's Board of Dental Examiners for ten years, 1935-45. A Fellow of the American College of Dentists, Dr. Colvin was Chairman of the D. C. Postgraduate Clinic of 1955. His brother, Dr. Melvin H. Hazen '28, also practices in Washington.

### **Maguire '30 Past Delaware President**

Dr. John F. Maguire '30, of Wilmington, Del., was President of the Delaware Dental Society, 1952-53. A Fellow of the American College of Dentists (1953), Dr. Maguire was a trustee of the State Board of Health, 1937-41, and has been a member of the State Board of Dental Examiners since 1954. He has presented clinics before the Chicago Midwinter Clinic, the A. D. A. and his state Society. In pursuing his hobby of weight lifting he has been President of the West Side Weight Lifting Society, 1945-50, and of the West Athletic Club, 1950-55. During the World War Dr. Maguire served in the Army

Air Force, 1942-45, with the rank of Major.

### **Jacobs '26 Honored in Newark**

The New Jersey Graduate Chapter of Sigma Epsilon Delta Fraternity honored Dr. Benjamin J. Jacobs '26, of Newark, at a testimonial dinner held at the Clinton Manor in Newark on February 26. Dr. Jacobs was given this signal honor by his fraternity group "in grateful recognition of his many years of service to dentistry and his fellow man." Other alumni were important participants in this culminating feature of the New Jersey Chapter's meeting.

Seated on the dais with Dr. Jacobs were Dr. Samuel Friedman '36, of Baltimore, Grand Master of Sigma Epsilon Delta; Dr. Irving Abramson '32, of Baltimore, Past Grand Master; Dr. Daniel D. Schwartz '36, of Paterson, N. J., Past Grand Master; and Dr. Allen Brotman '33, Chairman. Members of the Committee included Dr. Clifford Schwartz '33, of Newark; Dr. Allen Abrams '29, of Newark; and Dr. Edward Bressman '41, of Irvington. Among the clinicians who participated in the scientific phase of the meeting were Dr. Abrams; Dr. Leon C. Grossman '29, of Elizabeth; Dr. Bernard Lilien '34, of Newark; Dr. Newman '32, of Union City; Dr. Samuel E. Silber '29, of Newark; Dr. Irving Sofferman '28, of Newark; and Dr. Julius Sucoff '31, of Passaic.

### **Johnson '38 at Great Lakes**

Dr. W. Basil Johnson has held the rank of Captain in the Navy Dental Corps since 1955. He is Chief of Dental Services at the Great Lakes NTC Hospital. Captain Johnson is special-



izing in oral and maxillofacial surgery. He is a member of the Executive Board of the American Board of Oral Surgery and is also a member of the American Association for Cleft Palate Rehabilitation.

#### **Clendenin '29 Past President of D. C. Society**

Dr. George B. Clendenin '29, of Bethesda, Md., is a Past President of the District of Columbia Dental Society, Past Master of his Masonic lodge, and Past President of the Bethesda Rotary Club. Dr. Clendenin is a Fellow of the American College of Dentists and a member of the Maryland State Board of Dental Examiners.

#### **Collins '97: Pharmacist-Dentist- Physician**

Dr. Clarence E. Collins '97, of Crisfield, Md., is probably the only alumnus who possesses certificates issued by the State Boards for three professions: Pharmacy, Dentistry and Medicine. Born in Laurel, Del. in 1872, Dr. Collins attended the National College of Pharmacy and passed the Maryland Board of Pharmacy in 1895. In 1897 he received the D.D.S. degree from the University of Maryland. For two years he practiced in Crisfield. From 1899 to 1902 he was a Demonstrator on the Faculty of his alma mater. In 1902 he received the M.D. degree from the University of Maryland and began the practice of medicine in Crisfield, where he still practices at the age of eighty-five. Dr. Collins has been part-time Health Officer of Crisfield since 1910. From 1928 to 1946 he was associated with the U. S. P. H. S. Since 1940 he has been associated with the

Veterans Administration. He was President of the Chamber of Commerce (1912-24), President of the Red Cross of Somerset County (1920-32), and a member of the City Council (1914-18). In 1934 Dr. Collins began his research with the aloe vera plant which his son found growing wild in the Florida Everglades. He discovered that juice from the plant's leaves contains valuable therapeutic elements. After long experimentation Dr. Collins made an ointment (Alovera) that is now used extensively in the treatment of all kinds of burns, especially those resulting from overexposure to x-rays and radium.

#### **MacKay '00, Past Maine President**

Dr. George W. MacKay of the B. M. C. Class of 1900, who, at the age of eighty-one, practices in Millinocket, Me., was President of the Maine Dental Society in 1916-17. A Fellow of the American College of Dentists (1938), Dr. MacKay was a member of the Maine Board of Dental Examiners for ten years. He began practice in Millinocket following his graduation.

#### **Martin '05 Past Rhode Island President**

Dr. Henry A. Martin, of the B. C. D. S. Class of 1905, was President of the Rhode Island State Dental Society in 1925-26. A native of Newport, he has practiced in that city since his graduation. Dr. Martin was Vice-President of the Newport Dental Society for ten years and was Grand Knight of his Knights of Columbus council in 1913. He has supplemented his important professional activities by participating also in im-



portant local civic activities: member of the Planning Board for ten years, member of the Board of Tax Assessors for five years, Chairman of the Board of Tax Appeals for four years, and Dental Inspector, Board of Health for thirty-eight years.

#### **Harpin '98: Dentistry and Music**

Dr. Adelard Harpin (Harper) '98, of Worcester, Mass., has been a dental truant of the first order. Besides his professional interests, he has participated to a very impressive extent in civic activities and in the field of music. For twelve years he was Commissioner of Parks and Recreation of Worcester; he also served for twelve years as a Trustee of the Worcester Trade High School. Dr. Harpin has sung in all the principal cities of the United States and Canada. For a half century he was a Choir Director in the churches of Worcester. He achieved wide recognition in musical circles by his work as organizer and Director of the Gounod Male Quartette and as organizer and Director of the Philharmonic Choral Society (450 members).

#### **Schwartz '36 Past Grand Master of S. E. D. Fraternity**

Dr. Daniel D. Schwartz '36, who practices in Paterson and Little Falls, N. J., is the immediate Past National Grand Master of Sigma Epsilon Delta fraternity. He had been Master of the New Jersey Graduate Chapter in 1948. Dr. Schwartz has also served as Chancellor of the Knights of Pythias, President of the Passaic County Council for the Improvement of School Health Services, President of the Paterson Club Leaders, President of the New Jersey Club Leaders

Association, and President of the United Jersey Verein. During the World War Dr. Schwartz was in the Army Air Force, 1943-46, and was separated with the rank of Captain.

#### **Englander '32 Connecticut State President**

Dr. Jesse J. Englander '32, of Bridgeport, is President of the Connecticut State Dental Association (1957-58). Dr. Englander is a Past President of the Bridgeport Dental Association (1943-44) and the Probus Civic Club (1946-47). In 1946 he was elected National President of Probus. He served on the Board of Governors of the State Association from 1950 to 1955. He has made a fine contribution in the field of dental literature as Editor of the *Journal of the Connecticut State Dental Association* (1945-50) and of the *New England Dental Journal*, (1950-51). Dr. Englander is a member of Alpha Omega, Omicron Kappa Upsilon, and Gorgas Odontological Society.

#### **Brotman '22 Pioneer in Ultrasonics**

Dr. Robert H. Brotman '22, of Baltimore, has pioneered in the use of ultrasonics in dentistry. He is the official investigator for the use of Cavitron in Maryland. At the 1956 meeting of the Maryland State Dental Association he gave a clinic on the uses of ultrasonics in preparations. Throughout his career Dr. Brotman has been an important contributor in the field of lay education. He has contributed articles for the lay reader to several national magazines, and his *Let's Look at Your Teeth* has achieved wide distribution. The list of high offices held by Dr.



Brotman reflects a large sphere of interests: President of the Baltimore Alumni Chapter of Alpha Omega, President of the Ritchie Civic Club, Noble Grand of the I. O. O. F., Chairman of the A. Z. A. organizations in the Fifth District, and Chairman of the Beth Jacob School and Center. Dr. Brotman is the father of Dr. I. Norton Brotman '36 and the brother of the late Dr. A. Alfred Brotman '41.

#### **Sabatino '34 on New Jersey Board**

Dr. C. Frank Sabatino '34, of Plainfield, has been appointed a member of the New Jersey Board of Dental Examiners. Dr. Sabatino is a veteran of World War II, having served in the Navy Dental Corps for 34 months. He was separated with the rank of Lieutenant Commander. He is a Past President of the New Jersey Alumni Association (1952) and the Plainfield Dental Society (1952). In 1953 he was elected Chairman of the Plainfield City Committee of the Democratic Party. Dr. Sabatino is a member of Psi Omega.

#### **Gale '22 President of N. J. Group**

Dr. Saul M. Gale, of Newark, N. J., is President of the New Jersey Society of Dentistry for Children. Dr. Gale has been associated with the Dental Division of the New Jersey State Department of Health since 1943. From its beginning Dr. Gale has been a tower of strength in the affairs of the New Jersey Alumni Association. For many years he served as its Secretary; he is presently the President-Elect. He has been Secretary of the Newark Dental Club since 1935. Dr. Gale has been active as a clinician and as a

contributor to dental publications. He has also rendered a fine contribution to both the profession and his Alma Mater by sending two sons to the B. C. D. S.: Dr. Alan A. Gale '50 and Dr. Norman E. S. Gale '55.

Dr. Gale was preceded as president of the Society by Dr. William I. L. McGonigle '26, of Freehold; Dr. William R. Joule '34, of Newark; and Dr. Louis E. Greenwald '25, of Englewood. He will be succeeded by Dr. H. Milton Cooper '36, of Hackensack.

#### **Klock '26 Develops New Method of Anesthesia**

In the *Miami Herald* of June 10, Bert Collier, the *Herald* medical writer, praised the "new and revolutionary method of dental anesthesia" developed by Dr. James H. Klock '26, of Miami Beach, Fla. These are some of the comments made by Mr. Collier:

"Dr. Klock makes use of nitrous oxide. . . . His method adds an additional amount of oxygen. . . . The simple change provides the first general technique by which the throat reflexes are maintained, preventing aspiration of fluid and blood into the lungs. . . . Dr. Klock has used his method more than 5,000 times without a single untoward incident. It is particularly effective in surgery and prosthetics and in prolonged work on children. . . . His method also revolutionized the conventional concepts of surgery for cardiac and other patients. . . . The most important effect is the elimination of hypoxia. . . . Dr. Klock has maintained anesthesia for six to eight hours in extreme cases without ill effect."

While at Maryland, Dr. Klock was President of his class and Grand



Master of Psi Omega. He is a Past President of the Miami Beach Dental Society and of the East Coast District Dental Society.

#### **Stine '50, Nature Photographer**

Dr. Charles J. Stine '50, of Baltimore, has achieved a wide reputation for the excellence and variety of his work in the field of nature photography. In the past decade he has taken thousands of photographs of wild life. A selection of his photographs was on exhibit at the Enoch Pratt Library during the summer months. He has also exhibited at the University of Florida, the Academy of National Sciences in Philadelphia, and the Smithsonian. Dr. Stine has roamed the area from New Jersey to Florida in quest of subjects. He has contributed articles to the *Atlantic Naturalist*, *Maryland Naturalist*, *Nature* and *Frontiers*. He has also done a good deal of lecturing, with slides and movie, on various aspects of wild life. Dr. Stine is associated in practice with his father, Dr. Charles A. Stine '23.

#### **Blake '43 on Einstein Faculty**

Dr. Fred S. Blake '43 (November) was appointed Instructor in Oral Surgery at Albert Einstein College of Medicine in 1955. Dr. Blake entered the Army Dental Corps immediately after graduation and served till June, 1946 when he was separated as a Captain. He then began practice in Paterson, N. J. Following postgraduate study at Columbia in Exodontia and Oral Surgery he interned in Oral Surgery at Bellevue Hospital. Since 1948 he has specialized in Oral Surgery. In 1956 he opened a second office in Passaic, N.

J. Dr. Blake has contributed several articles to the *Journal of Oral Surgery* and to *Oral Surgery, Oral Medicine, Oral Pathology*. He has presented clinics at Greater New York, A. D. A., and New Jersey State Dental Association meetings. Dr. Blake is affiliated with four hospitals: Adjunct Oral Surgeon, Barnert Memorial Hospital, Paterson; Assistant Visiting Dental Surgeon, Bronx Municipal Hospital Center; Consultant Oral Surgeon, Chilton Memorial Hospital, Pompton Plains; Consultant Oral Surgeon, Riverside Hospital, Boonton. He is a member of Sigma Epsilon Delta.

#### **Gould '28 with VA**

Dr. Charles K. Gould '28, who has been associated with the VA since 1946, has been assigned to Washington, D. C., since 1951. Following his graduation Dr. Gould practiced in Pacolet Mills, S. C. (1928-30), Spartanburg, S. C. (1930-33), and Columbia, S. C. (1933-36). During 1936-38 he was on active duty with the Army, stationed at Fort Oglethorpe and Fort Bragg. He returned to private practice, 1938-39, in Landrum, S. C. He spent the next year as a civilian dentist with the CCC at Fort Bragg. He served his second Army tour in 1940 to 1946, with these assignments: Division Dental Surgeon, Fort Jackson (1940-42); Chief of Dental Clinic, Fort Bragg (1942-44); Medical Technical Instructor, Fort Lewis (1944-45); and Assistant Post Dental Surgeon and Chief of Dental Clinic, Fort Campbell (1945-46). Dr. Gould holds a Colonel's commission in the U. S. A. R. (1953). In 1946 he began his affiliation with the VA.



### Krasner '43 Researcher in Anesthesiology

Dr. Herbert A. Krasner '43 (November) entered the Army shortly after graduation and served till his separation in 1946 with the rank of Captain. For the next five years he engaged in general practice in Verona, N. J. Since 1951 he has specialized in Oral Surgery in Bloomfield, N. J. Dr. Krasner has contributed several papers on anesthesia to the *Journal of Oral Surgery* and the *Journal of the New Jersey State Dental Society*. He has also presented clinics on "Intravenous Anesthesia" before the A. D. A. meetings of 1955 and 1956 and the A. M. A. meeting of 1957. Dr. Krasner is now engaged in an investigation of the oral and intramuscular use of combined cortisone and antihistamines for decreasing and/or eliminating postoperative edema and trismus and for eliminating inflammation following endotracheal intubation. Dr. Krasner is a member of Alpha Omega.

### Page '48 Specializing in Periodontia

Dr. James C. Page, Jr., of Tampa, Fla., Gold Medal man of the Class of 1948, has specialized in Periodontia since 1953, following his separation from the Air Force. He had engaged in general practice, 1948-51. Dr. Page has presented clinics and papers before the Hillsborough County Society, West Coast District Society, Polk County Society, Sarasota Society, and the Florida State Society. He is a Past President of the Tampa Dental Study Club (1955). Dr. Page is a member of Psi Omega, Gorgas Odontological Society, and Omicron Kappa Upsilon.

### Bowers '29, Commander in U. S. P. H. S.

Dr. Mark E. Bowers '29 entered the Public Health Service in 1931 and was assigned to Staten Island, N. Y. In the 26 years of his service he has been stationed at Louisville, Ky., (1934-37 and 1944-48); Staten Island again (1937-41); U. S. Coast Guard Academy (1941-44); Washington, D. C. (1948-52); Seattle, Wash. (1952-53); and Norfolk, Va. (1953—). Commander Bowers is a member of Psi Omega.

### Whitcomb '26 of Hartford

Dr. Robert W. Whitcomb '26 has specialized in Oral Surgery since 1928. He is a Past President of the Connecticut Society of Oral Surgeons (1950) and of the New England Society of Oral Surgeons (1952). In 1940 he became a Fellow of the International College of Anesthetists. Dr. Whitcomb has presented papers and clinics before the Hartford Dental Society and the New England Dental Society. Dr. Whitcomb is a Past Master of his Masonic lodge and has held several high offices in the Shriners.

### Vezina '32 Has Long Military Record

Dr. George Vezina '32, of Woonsocket, R. I., has been affiliated with the armed forces for 34 years. Previous to his coming to Maryland he had served for five years in the Rhode Island National Guard. From 1933 to 1939 he was in the Officers Reserve Corps as a First Lieutenant and from 1939 to 1943 he was a Captain in the National Guard. In 1943 he was commissioned as a Major in the A. U. S.; in 1945 he received his Lieutenant Colonel's commission.



Since his separation from active service, Dr. Vezina has continued his Reserve association; he is now assigned as Oral Surgeon, 455th General Hospital, U. S. A. R. During World War II, he served in Guadalcanal, the Solomons, New Guinea, and the Philippines. Dr. Vezina has been Chief of Dental Service at the Woonsocket Hospital since 1955 and is Deputy Director of Civil Defense for Woonsocket.

### **Merriam '25 Captain in Navy**

Dr. Kenmore E. Merriam '25 practiced in Baltimore, Md., 1925-41. He then entered the Navy Dental Corps, assigned to Norfolk, Va. He was stationed at U. S. N. Hospital in Yokusaka, Japan, 1951-53, and is now at the Naval Shipyard in San Francisco, Cal. Captain Merriam has specialized in Prosthetics since 1946.

### **Johnson '54 on University of Washington Faculty**

Dr. Ernest A. Johnson, Jr. '54 has been appointed an Instructor in Operative Dentistry of the School of Dentistry, University of Washington in Seattle. Dr. Johnson was discharged from the Army in December 1956 with the rank of Captain. While stationed at Fort Richardson in Alaska, he became enthusiastic over the Northwest and resolved to return to that area after his separation from the service.

### **Doctor '50 Practitioner in Three Countries**

Dr. Paul M. Doctor, of Baltimore, Md., received his D.M.D. from the University of Wuerzburg, Germany, in 1932. He practiced in his native Meiningen till 1938. From 1939 to

1946 he practiced in Calcutta, India. On coming to the United States he was required, under the regulation governing possessors of dental degrees from foreign schools, to take the junior and senior years in an American school. Dr. Doctor chose the University of Maryland as his second alma mater and received his D.D.S. degree in 1950. Since then he has practiced in Baltimore. Dr. Doctor is active in the Unitarian Laymen's League and was President of the Baltimore Chapter in 1955-56.

### **Cloutier '14 in Both World Wars**

Dr. George A. Cloutier, Jr., of the B. C. D. S. Class of 1914, served in the Army Dental Corps from June 1917 to October 1920. Dr. Cloutier was at Camp Devens with the 76th Division, in France and Germany with the 1st Division, at Ft. McHenry with General Hospital No. 2, and at Fort Ethan Allen. He was separated with the rank of Captain. In World War II he was called to active duty in December 1941 as a Lieutenant Colonel. His assignments included service with the 6th corps in North Carolina, Scott Field, and the Sixth Service Command in Chicago. After his discharge he returned to Portland, Me., to continue his practice of the specialty of Prosthodontia. Dr. Cloutier received the B. A. degree from the University of Sherbrooke (Canada) in 1911. He is a member of Xi Psi Phi.

### **Paquette '33—Varied Career**

When Dr. Normand J. Paquette graduated in 1933, his classmates gave him two citations: "hardest working man in the class" and "most valuable man in the student body."



The validity of these judgments seems to have been well certified by Dr. Paquette's professional career. He began practice in Unity, Me., in 1933. He removed to Rumford in 1934, and from 1940 to 1943 practiced in Lewiston. During the World War he served in the Navy. In 1945 he opened an office in the college town of Waterville, where he has continued to practice. Dr. Paquette has contributed several articles to various journals and has presented clinics and papers before many meetings, including those of the state societies of Maine, Rhode Island, and Massachusetts. He is the founder and a Past President (1937) of the Maine Society of Dentistry for Children. A Past President of the Exchange Club (1953), he has also served as Governor of the Maine Division. There are four other facets to Dr. Paquette's activity: he is a Past President of the Waterville PTA Council and holds office in the state organization; he is also a Past President of the Waterville Chapter of the Society for the Preservation and Encouragement of Barber Shop Singing in America (1950); he designed and copyrighted two dental charts; and he has several hobbies: drawing, oil painting, and photography.

#### **Schwartz '42 on Pennsylvania Faculty**

Dr. Harold Schwartz '42, who has offices in New York City and in Belle Harbor, N. Y., has been a member of the Faculty of the University of Pennsylvania School of Dentistry since 1953, when he became an Instructor in Oral Reconstruction. Dr. Schwartz has presented papers on crown and bridge before many local

and state societies. During the World War he served in the Navy, 1943-46, chiefly sea duty in the Pacific.

#### **Lee '48 on Tufts Faculty**

Dr. Robert E. Lee '48, of Framingham, Mass., has specialized in Oral Surgery since 1956. He received his postgraduate training at the Graduate School of Medicine, University of Pennsylvania and at the Tufts Dental School. Dr. Lee served two tours of duty in the Army: in the infantry, 1942-43, and in the Dental Corps, 1951-52. From 1952 to 1954 he was a member of the Tufts Faculty as Instructor in X-Ray and Oral Diagnosis; in 1956 he was appointed Instructor in Oral Surgery.

#### **Lankford '12 Maryland Past President**

Dr. Arthur Lankford '12, of Baltimore is a Past President of the Maryland State Dental Association, 1922-23. He is a Past Grand Master and a charter member of the Oriole Alumni Chapter of Psi Omega. A Fellow of the American College of Dentists, Dr. Lankford served in World War I, 1917-19, as a Major in the Army Dental Corps.

#### **Kader '39 Researcher in Anesthesiology**

Following his graduation Dr. Marshall I. Kader '39 interned at the Episcopal Hospital in Washington, D. C. He spent the next year at Episcopal as a resident in Oral Surgery. From 1942 to 1945 he served in the Army, his major assignment being that of Chief of Oral Surgery at the 114th General Hospital (E. T. O.). In 1946 he joined the faculty of the Baylor University College of Den-



tistry as Associate Professor of Exodontia and Oral Surgery. In 1948 he returned to Baltimore to continue the practice of the specialty of Exodontia and Oral Surgery that he had begun in 1941-42. As an Instructor in Oral Surgery, Dr. Kader served on the faculty of his alma mater from 1948 to 1951. He has contributed to the literature and has presented many papers and clinics on subjects related to the dental uses of anesthesia. At present he is doing continuing research in anesthesiology and pharmacology as they relate to the care of the post-extraction socket and the treatment of the painful temporomandibular articulation. Dr. Kader is on the staffs of Sinai Hospital and Lutheran Hospital and he is Chief Consultant in Oral Surgery at Provident Hospital.

#### **McGrail '23 Combines Two Careers**

Dr. Clement J. McGrail '23, of New Haven, Conn., is undoubtedly one of the most businesslike men in the dental profession. He also must be one of the busiest men in the profession. Besides his professional activities, he seems to have developed another full career in business. He is secretary-treasurer of the Electric Radiant Heat Corporation, treasurer of the Taft Pharmaceutical Products Corporation, president of the McGrail Realty Corporation, and owner-operator of the McGrail Professional Building. A former commodore of the New Haven Yacht Club, Dr. McGrail owns a schooner yacht.

#### **Edwards '07 Past North Carolina President**

Dr. Linus M. Edwards '07, of Durham, N. C., was President of the North Carolina Dental Society, 1934-35. Dr. Edwards is a Fellow of the American College of Dentists.

#### **Spoon '43 on Bowman Gray Faculty**

Dr. Riley E. Spoon, Jr. '43 (March), of Winston Salem, N. C., has served since 1946 as Instructor in Dentistry at the Bowman Gray School of Medicine. Dr. Spoon is Past President of the Second District Dental Society and of the District Officers Conference of the North Carolina Dental Society. He has presented papers and clinics before North Carolina local, district and state meetings. Dr. Spoon served in the Army Dental Corps, 1943-46.

#### **Selby '02 Honored by Rotary Club**

Dr. Benjamin F. Selby, of the University of Maryland Class of 1902, was honored on October 25 by his fellow members of the Oakland, Md. Rotary Club. Born in Howard County, Md., in 1880, Dr. Selby at 77 continues to practice in the office he has occupied for 55 years. In the tribute paid to Dr. Selby, who is a charter member of Oakland Rotary, the president described him as "Respected, beloved, quiet, unassuming, humble and honest"—one who has "exemplified over the years the true meaning of Rotary in its highest sense."



## CHAIRMEN OF 1958 CLASS REUNIONS

1908—Sol. B. Hoffman, 2036 Eutaw Place, Baltimore 17 (with the assistance of the chairman of the Alumni Committee).

1913—Joel Fleishman, Latrobe Building, Charles Street, Baltimore 1.

1918—U. of Md.—E. Leroy Knoebel, 1763 Montpelier Street, Baltimore 13; B. C. D. S.—Edwin G. Gail, 3700 N. Charles Street, Baltimore 18.

1923—U. of Md.—C. C. Coward, 2501 E. Preston Street, Baltimore 13; B. C. D. S.—F. Noel Smith, Medical Arts Building, Baltimore 1.

1928—Paul A. Deems, 835 Park Avenue, Baltimore 1.

1933—Philip L. Block, 36 N. Luzerne Avenue, Baltimore 24.

1938—A. Bernard Eskow, Medical Arts Building, Baltimore 1.

1943 (March)—David B. Scott, Dental Research Section, National Institutes of Health, Bethesda 14, Maryland.

1943 (November)—R. Kent Tongue, 17 W. Pennsylvania Avenue, Towson 4, Maryland.

1948—W. Robert Biddington and Jose E. Medina, Dental School, University of Maryland.

1953—Donald F. Laird, 2878 Harford Road, Baltimore 18.



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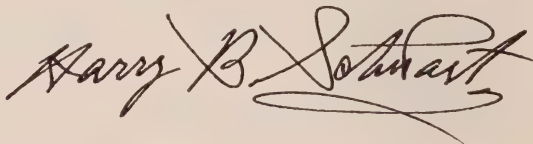
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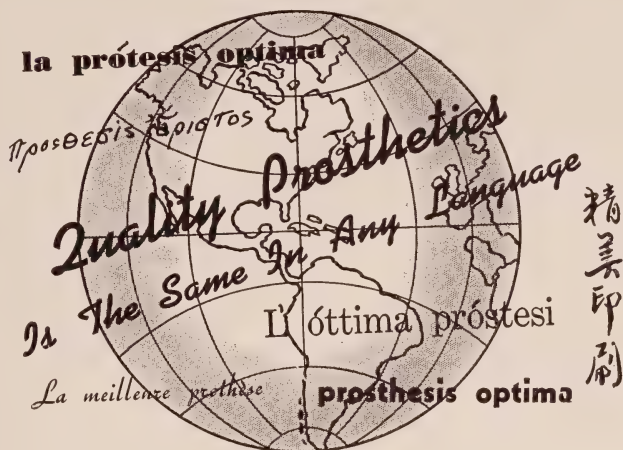
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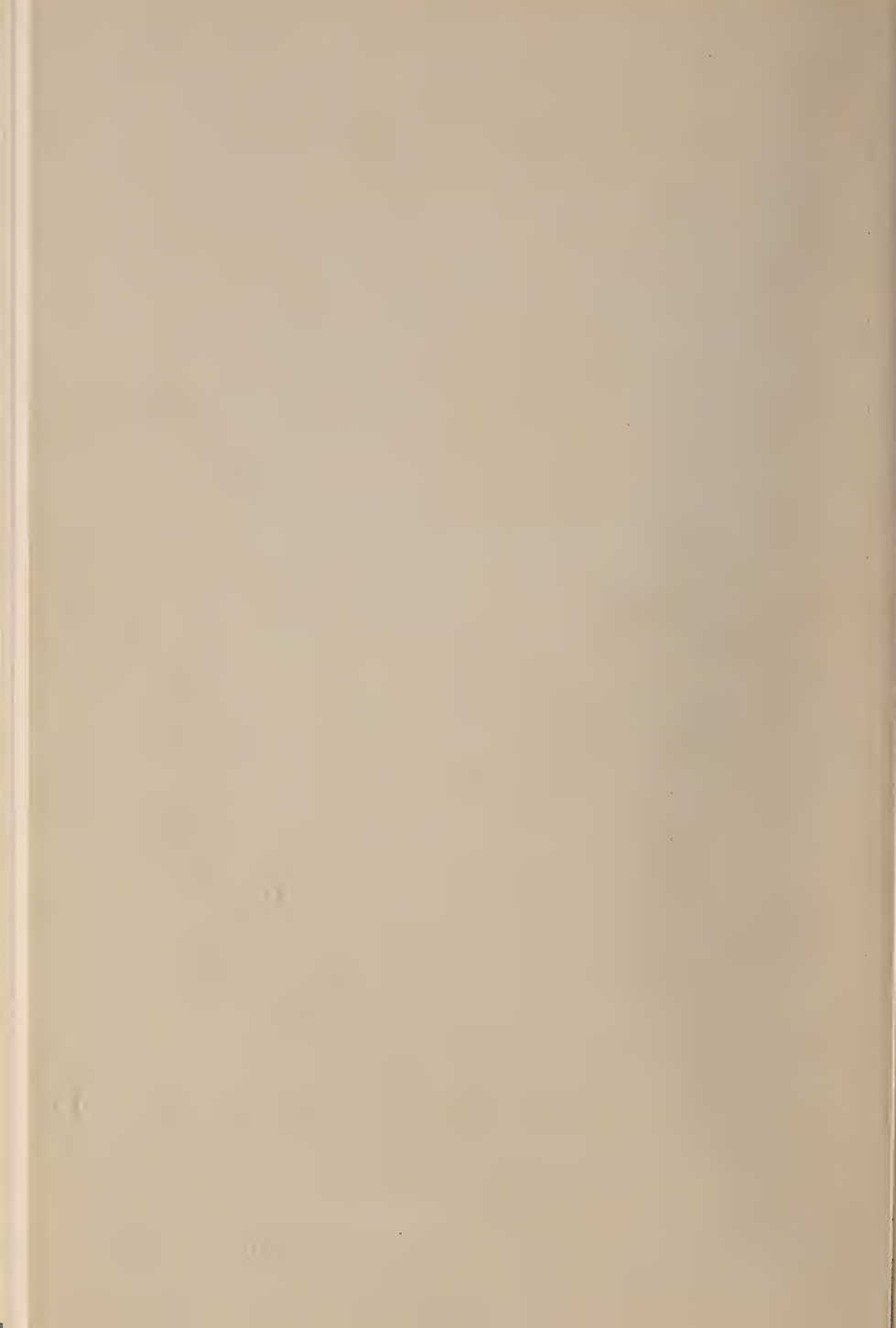
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# *The* JOURNAL *of the*

BALTIMORE COLLEGE OF DENTAL SURGERY  
DENTAL SCHOOL • UNIVERSITY OF MARYLAND



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The **JOURNAL** of the  
BALTIMORE COLLEGE OF DENTAL SURGERY  
DENTAL SCHOOL • UNIVERSITY OF MARYLAND

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VOL. 17

No. 2

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# COMMENCEMENT PROGRAM

## WEDNESDAY, JUNE 4

6:00 p.m.—Caswell Room, Lord Baltimore Hotel  
OMICRON KAPPA UPSILON (PHI CHAPTER)  
Banquet and Convocation

## THURSDAY, JUNE 5

9:00 a.m.-4:30 p.m.—Dental School  
Registration of Alumni  
9:00 a.m.—Room 37  
Meeting of the Officers, Council and Trustees of the National  
Alumni Association  
10:00 a.m.—Room 54  
Annual Business Meeting of the National Alumni Association  
12:30 p.m.—Dental School Library  
Complimentary Luncheon for Alumni

### REUNION DINNERS FOR CLASSES OF

|      |      |
|------|------|
| 1908 | 1933 |
| 1913 | 1938 |
| 1918 | 1943 |
| 1923 | 1948 |
| 1928 | 1953 |

## FRIDAY, JUNE 6

10:00 a.m.—Suburban Country Club  
Golf Tournament Followed by Luncheon and Presentation of Prizes  
6:00 p.m.—Southern Hotel  
Cocktails  
7:00 p.m.—  
Banquet and Dance Honoring the Graduating Class and Distinguished Alumni Who Are Serving as Deans of Dental Schools  
Dean J. Ben Robinson—West Virginia University  
Dean Frank J. Houghton—Loyola of New Orleans  
Dean Harry B. McCarthy—Baylor University  
Dean Myron S. Aisenberg—University of Maryland

## SATURDAY, JUNE 7

9:45 a.m.—College Park  
Graduation Exercises

### 1958 ANNUAL MEETING COMMITTEE

|                                |  |
|--------------------------------|--|
| Harry W. F. Dressel,           | Calvin Gaver, <i>Faculty Chairman</i>  |
| <i>Alumni Chairman</i>         | Katharine Toomey, <i>Publicity</i>     |
| Eugene D. Lyon, <i>Banquet</i> | William L. Graham, <i>Reservations</i> |
| W. Robert Biddington,          |  |
| <i>Registration</i>            |  |
| Irving Abramson, <i>Golf</i>   |  |



## OFFICERS OF THE NATIONAL ALUMNI ASSOCIATION

|                          |                            |
|--------------------------|----------------------------|
| Daniel E. Shehan.....    | <i>President</i>           |
| Edwin G. Gail.....       | <i>President-elect</i>     |
| Joseph J. Martini.....   | <i>Vice-President</i>      |
| Joseph P. Cappuccio..... | <i>Secretary</i>           |
| Howard Van Natta.....    | <i>Treasurer</i>           |
| Kyrle W. Preis.....      | <i>Editor</i>              |
| Milton B. Asbell.....    | <i>Historian-Librarian</i> |

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 Edwin G. Gail  
 Daniel E. Shehan  
 Joseph M. Tighe  
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 Irvin B. Golboro  
 Edwin C. Morin  
 Lewis C. Toomey, Jr.

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 Max K. Baklor  
 Frank Hurst  
 Wilbur B. Mehrling  
 Eugene L. Pessagno, Jr.  
 John T. Stang

*Council Representatives*

Harry Levin  
 Eugene D. Lyon  
 Daniel E. Shehan

**RHODE ISLAND ALUMNI SECTION FORMED**

A very successful organizational meeting of the Rhode Island Alumni group was held at the Sheraton-Biltmore Hotel in Providence, on January 26. Forty alumni were present from various towns and cities of the state.

Dr. Joseph P. Cappuccio '46, Secretary of the National Alumni Association, and Dr. Edwin G. Gail '18, President-elect, attended as representatives of the Association.

Dr. Edward C. Morin '20 and Dr. William F. Decesare '36 served as co-chairmen of the committee that made the arrangements for this meeting. Following cocktails and dinner the group proceeded to form the new Section and elect these officers:

President: Dr. Edward C. Morin, Pawtucket.

1st Vice-President: Dr. Eric Waxberg, Providence.

2nd Vice-President: Dr. Edward A. Lynaugh, Pascoag.

Secretary: Dr. William F. Decesare, Providence.

Treasurer: Dr. Charles E. Heaton, Providence.

Editor: Dr. A. James Kershaw, West Warwick.

Historian: Dr. Eugene M. Nelson, Providence.

Dr. Cappuccio, the official representative of the Alumni Association, and Dr. Gail presented short talks to the group. Dr. Morin and Dr. Decesare should be congratulated for their hard work toward making the Section a reality.

Those alumni who attended the meeting are listed below:



1914—Joseph C. Carvalho, Fall River, Mass.

1915—Edward A. Lynaugh, Pascoag.

1918—Edwin G. Gail, Baltimore, Md.

1919—Eric Waxberg, Providence.

1920 — Edward C. Morin, Pawtucket.

1926 — Samuel Pressman, Providence.

1929—Joseph A. Capone, Howard.

1932—Edgar L. Bessette, Cranston; A. James Kershaw, West Warwick; George O. Vazina, Woonsocket.

1933 — William J. McDermott, Pawtucket.

1934—Charles E. Heaton, Providence; Arthur Josephson, Newport.

1935—Arthur Jordan, Edgewood.

1936—William F. Decesare, Providence.

1937 — William R. Casey, Pawtucket; Raymond Gaudreau, Pawtucket; Peter T. Kanelos, Providence.

1939 — William J. Noon, Providence.

1942—J. Ralph Reynolds, West Warwick.

1943 (November)—P. Edward Capalbo, Westerly.

1944—Frank S. Celestino, Peace Dale.

1945 — Leonard Komros, Pawtucket.

1946—Charles C. Calenda, Providence; Joseph P. Cappuccio, Baltimore; Eugene Nelson, Providence; Mario Pires, Pawtucket; Frank V. Tirocchi, Providence.

1947—Ferdinand Ascioffa, Providence; William D'Abbraccio, North Providence; James P. Gill, Warwick.

1949 — Albert C. Picozzi, North Providence.

1951 — Jacob Komros, Pawtucket; George A. Weir, Jr., Providence.

1954—Christopher J. Hanley, West Warwick; Herbert J. Underhill, East Greenwich.

1957—Peter Pecoraro, Jr., West Warwick; John V. Puleo, Manville.

**J. P. Cappuccio**





*Dr. A. Raymond Oliva '32 Presenting New Jersey Alumni Award to Dr. Myron S. Aisenberg '22.*

### **1958 MEETING OF NEW JERSEY ALUMNI**

The New Jersey Alumni Association held its annual dinner-dance at the Military Park Hotel in Newark on February 8. The affair was an outstanding success, one of a long line of impressive functions sponsored by the strongly organized New Jersey group. Over the years the New Jersey alumni not only have maintained a valuably participant Section of the National Alumni Association but also have nurtured a strong feeling of loyalty to their alma mater. The Association and

the School are both grateful for the continued manifestation of this spirit of effective contribution and devoted allegiance.

Continuing a custom that was inaugurated last year, the New Jersey Association presented an award in recognition of the recipient's outstanding service to the Alumni. The Award for 1958 was presented to Dr. Myron S. Aisenberg '22, Dean of the Baltimore College of Dental Surgery, Dental School, University of Maryland since 1954. The plaque, which



was presented to Dr. Aisenberg by Dr. A. Raymond Oliva '32, President of the Association, bears this traditional inscription: Presented to Dr. Myron S. Aisenberg '22 in recognition of unselfish service to the dental profession and in appreciation of his devoted efforts in behalf of our alumni.

Dr. Joseph J. Martini '34, Chairman of the Selection Committee, in presenting Dr. Aisenberg, said:

"Dr. Myron S. Aisenberg was born in New Britain, Connecticut. He graduated with honors from the University of Maryland in 1922.

"Since his graduation Dr. Aisenberg has been a member of the faculty of his Alma Mater, in histology, embryology, bacteriology, and pathology. He founded the Department of Oral Pathology and, in 1940, he was appointed Professor of General and Oral Pathology.

"Dr. Aisenberg is a Past President of the Maryland State Dental Association, the National Chapter of Alpha Omega, and the American Academy of Oral Pathology. He is a diplomate of the American Board of Pathology and is now serving on the American Board of Oral Pathology.

"Dr. Aisenberg's memberships include also the Gorgas Odontological Society, Omicron Kappa Upsilon, Sigma Xi, American College of Dentists, and International Association for Dental Research. He is an honorary member of the Baltimore and the Maryland State Medical Pathology Societies. He is a consultant to the Lutheran Hospital, University Hospital, Sinai Hospital and Levindale in Baltimore and to the National Institutes of Health (Bethesda,

Md.) and the Veterans Hospital in Beckley, West Virginia.

"Dr. Aisenberg is nationally known for his contributions to the literature of dentistry. He has presented over 250 clinics and papers before all of the national dental societies, and a large number of local and state societies. His research efforts have been devoted to the areas of orthodontics, periodontics, endodontics, oral surgery, and oral pathology.

"He received the Alpha Omega Achievement Award in 1954."

The members of the New Jersey Association who attended were Samuel Abrams, '27, Patrick L. Andre (Andreorio) '36, Arthur A. Aria '48, Winfield Joseph Atno '22, George H. Aumock '34, John F. Bauder '24, Benjamin A. Brown '28, Charles E. Burroughs '34, Anthony Caputo '37, Bernard deHosson '47, Jerome C. Doherty '48, Leonard Farrant '36, Andrew N. Federico '56, Alan A. Gale '50, Norman E. Gale '55, Saul M. Gale '22, Albert O'Neil Grant '45, Louis E. Greenwald '25, Alfred Hamer '34, Robert H. Jernick '50, William R. Joule '34, Irvin B. Kaplan '28, Bruno L. Kuta '36, Angelo R. Lombardi '47, James F. Mahon '51, Joseph Martini '34, Paul M. Mitchell '50, Anthony F. Monaco '48, J. B. Moss '23, A. Raymond Oliva '32, Thomas H. Paterniti '56, William H. Pengel '24, George Reusch '41, C. Frank Sabatino '34, Daniel Scotti '50, Harry A. Silberman '23, Elwood S. Snyder '31, Percival Spitzen '30, Leontius W. Toffie '51, Paul D. Torre '51, Louis Ulanet '25.

A large delegation of Baltimore alumni and members of the Maryland faculty went to Newark to associate



with the New Jersey men in honoring Dean Aisenberg: Irving Abramson '32, Alvin Aisenberg '45, George M. Anderson '19, Arthur Bell '19, W. Robert Biddington '48, Charles A. Bock '22, Joseph P. Cappuccio '46, George Clendenin '29, Luther Emmart '22, James H. Ferguson, Jr. '15, William Graham '53, Elmer Hoffman

'36, Conrad L. Inman '15, William Kress '36, Richard Leonard, Raymond Palmer '56, Burton Pollack '46, Kyrle Preis '29, D. Vincent Provenza, James E. Pyott '26, Wilbur O. Ramsey '43, Carl A. Schulteis '41, Donald Shay, Daniel E. Shehan '22, E. G. Vanden Bosche.



*Left to Right: Dr. Edwin G. Gail, President-Elect; Dr. Walter A. Brown, Chairman West Virginia Section; Dr. Joseph P. Cappuccio, Secretary; Dr. Myron S. Aisenberg; Dr. Kyrle W. Preis, Editor.*

### **"CONFERENCE ON WEST VIRGINIA SECTION"**

Immediately following the Alumni Breakfast in Washington Dr. Walter B. Brown of Fairmount, West Virginia met with president-elect Dr. Edwin Gail, secretary, Dr. Joseph P. Cappuccio, Editor, Dr. Kyrle W. Preis, and Dean Myron Aisenberg

to discuss the formation of an alumni section in West Virginia. Our Association encourages the establishment of sectional organizations and wishes success to Dr. Brown in his efforts.

K. W. Preis





*Mrs. E. Benton Taylor and the Recipients of the E. Benton Taylor Scholarship. Sitting: Goetee, Mrs. Taylor, Brown; Standing: Snyder, Myers, Plassnig*

#### FOURTH YEAR OF TAYLOR SCHOLARSHIP

The E. Benton Taylor Scholarship, which was presented to the School on September 21, 1954, is in its fourth year and has been awarded to members of each of the four classes now in session. An outstanding award in dental education, the Scholarship was conceived and arranged by Mrs. E. Benton Taylor to perpetuate her husband's faithful interest in the students of the School.

The Scholarship was first awarded at the beginning of the 1954-1955 academic year to George L. Plassnig, of Baltimore, a member of the Class of 1958. Other recipients of the Scholarship are John W. Myers, of Fairplay, Md., Class of 1959; Alvin J. Snyder, of Baltimore, Class of 1960; John G. Goetee, Jr., of Reisterstown, Md., and Donald A. M. Brown, of Landover Hills, Class of 1961, who received a joint award.





*Alumni at the Washington Breakfast*



## WASHINGTON ALUMNI BREAKFAST

By Joseph P. Cappuccio

A very successful Alumni breakfast of the National Alumni Association of the Baltimore College of Dental Surgery, Dental School, University of Maryland was held at the Shoreham Hotel on Tuesday, March 11, 1958. This breakfast was held in conjunction with the Post Graduate Clinic of the District of Columbia Dental Society.

Approximately 85 alumni and guests were present from various sections of the east coast. This meeting marked the largest gathering to attend a Washington, D. C. alumni breakfast.

This affair was under the direction of Dr. Ashur G. Chavoor, a graduate of the Class of 1948.

Seated at the head table were Dean Myron S. Aisenberg, Dr. Edwin G. Gail, president-elect of the National Alumni Association, Dr. Frank Hurst, past-president of the National Alumni Association, Dr. Kyrle W. Preis, Editor of the National Alumni Association, Dr. Melvin H. Colvin, president of the District of Columbia Dental Society, Dr. Ashur G. Chavoor and Dr. Joseph P. Cappuccio, Secretary of the National Alumni Association, Miss Katharine Toomey, administrative secretary to the Dean.

Due to illness, Dr. Daniel E. Shehan, President of the National Alumni Association, was unable to attend. Dr. Cappuccio represented Dr. Shehan on behalf of the National Alumni Association and he brought greetings from the President.

Dr. Chavoor, as Host-chairman, gave a word of greeting and welcomed the many alumni members

present at the meeting. He introduced, Dr. Cappuccio who served as toastmaster. Dr. Colvin was introduced as President of the D. C. Dental Society and as a graduate of the Dental School, University of Maryland. Dean Myron S. Aisenberg was called upon to report on the activities of the dental school. He informed the alumni of the many changes that are occurring at the dental school and that the School will offer its first Post-Graduate course in Endodontics during the summer. Dr. Gail, the president-elect, informed those present of the breakfast meeting to be held in Dallas, Texas during the ADA meeting. He asked that the alumni continue to support its association which seems to be growing in number each year.

The secretary, Dr. Cappuccio, reported on the activities of June Week to be held on June 4, 5, 6, 7, 1958. He stated that many alumni sections are in the process of organizing. At present there are two official alumni sections, the New Jersey alumni Section and the Rhode Island Alumni Section. It is hoped that there will be new sections organized in West Virginia, North Carolina and Florida.

Among those introduced were Dr. Daniel F. Lynch, a past-president of the ADA and Dr. James H. Ferguson, Jr., a past-president of the American College of Dentists. Both of these distinguished gentlemen are graduates of the Dental School, University of Maryland.

Dr. Hurst, a past-president of the association, and Dr. Kyrle W. Preis, the editor of the Association, were





*Scenes at the Washington Breakfast*



given a fine ovation when they were introduced from the head table. The largest ovation was reserved for Miss Katharine Toomey, who is loved and revered by all of our alumni for the many nice things she has done throughout the years. Also introduced as hard working members of the Association, Dr. W. Paul Hoffman, Dr. J. P. Fitzgerald, Dr. George B. Clendenin who were very active on the Constitution and By-laws Committee of the Association. These men contributed greatly to the newly proposed Constitution and By-laws of the National Alumni Association.

Mr. Phil Taylor, the Director of Visual Education, Dental School, University of Maryland, must be congratulated for the excellent job that he accomplished photographing this most memorable breakfast meeting.

This meeting will long be remembered by all those in attendance as being one of the joyful and happy occasions in the lives of our alumni members.

Those alumni who attended the breakfast are listed below:

1907 — Richard F. Simmons, Norfolk, Va.

1910—S. Vernon Strickler, Charlottesville, Va.

1915—James H. Ferguson, Jr., Baltimore.

1916—Denzell C. Blevins, Washington, D. C.

1918 — Edward Gail, Baltimore; Dan O. Via, Charlottesville, Va.

1921—Maurice A. Brackett, Federalsburg, Md.

1922—Myron S. Aisenberg, Baltimore; Ronald C. Dove, Lacombe, La.

1924—James B. Bradley, Washington, D. C.; Albert R. James, Silver Spring, Md.; James W. McCarl, Greenbelt, Md.

1925—Ernest M. Colvin, Washington, D. C.; Daniel F. Lynch, Washington, D. C.; Leonard A. Romino, Fairmont, Va.; Howard B. Wood, Cumberland, Md.

1926 — Roy H. Bridger, Silver Spring, Md.; Allan L. Watts, Shipensburg, Pa.

1927—John P. Fitzgerald, Washington, D. C.; Paul Hoffman, Washington, D. C.; Frank Hurst, Washington, D. C.

1928—William C. Bashore, Bethesda, Md.; Melvin H. Colvin, Washington, D. C.; Charles K. Gould, Washington, D. C.; Wilbut B. Mehring, Silver Spring, Md.; A. Harry Ostrow, Washington, D. C.

1929 — George B. Clendenin, Bethesda, Md.; Kyrle W. Preis, Baltimore.

1934—John P. Grove, Baltimore.

1936 — Samuel Hanik, Silver Spring, Md.

1937 — F. Melvin Edwards, Red Bank, N. J.; John Heck, Baltimore; Robert G. Miller, Baltimore.

1938—Julian W. Habercam, Baltimore; Jack M. Messner, McLean, Va.; Ernest V. Williams, Washington, D. C.

1939 — Robert E. Jacoby, Chevy Chase, Md.; Harold E. Plaster, Shelby, N. C.

1941 — Robert N. Baker, Kings Mountain, N. C.



1942 — Lewis C. Toomey, Silver Spring, Md.

1943 (March)—Richard S. Mehring, Kensington, Md.

1944—James J. Brown, Washington, D. C.; Walter B. Brown, Fairmont, W. Va.

1945 — John J. Cicala, Silver Spring, Md.; Gerald Rose, Washington, D. C.

1946—Joseph P. Cappuccio, Baltimore; George B. LaMotte, York, Pa.

1947—Samuel W. Johnston, Fort Lauderdale, Florida.

1948—W. Robert Biddington, Baltimore; Ashur G. Chavoor, Washington, D. C.; William P. Dodson, Arlington, Va.; Paul H. Loflin, Beckley, W. Va.; Edwin R. Rapp, Silver Spring, Md.; William T. Strahan, Silver Spring, Md.; Ben A. Williamsowsky, Silver Spring, Md.

1950—Clement F. Hahn, Elkton, Md.; A. Clyde Hannah, Salisbury, Md.

1951—Douglas A. Edwards, Red Bank, N. J.; Jack D. Robertson, Washington, D. C.; Thomas E. Wolf, Lancaster, Pa.

1952—John G. Barry, Baltimore; Eugene Hinds, Baltimore.

1953—Sidney C. Abrams, Kensington, Md.; James Markwood, Rockville, Md.; Kenneth W. Prentice, Silver Spring, Md.; Harvey L. Wertz, Silver Spring, Md.

1954—Kenneth H. Stoll, Arlington, Va.

1955—James T. McCarl, Greenbelt, Md.; William F. Martin, Jr., Baltimore; Albert W. Zanner, Jr., Washington, D. C.

1956—Kenneth E. Bertram, New Cumberland, Pa.; Clayton S. McCarl, Greenbelt, Md.; Harry L. Mertz, Jr., Edgewood, Md.; James Philip Norris, Baltimore; Raymond W. Palmer, Jr., Catonsville, Md.

1957—William G. Franklin, Gaithersburg, Md.; Herbert H. Rust, Silver Spring, Md.

## REPORT ON THE HARRINGTON FUND

A recent anonymous gift of \$459.50 has brought the total of the Albert A. Harrington Student Loan Fund to \$1,336.28. Dr. Oscar W. Meyer '25, of Hasbrouck Heights, N. J., who has been a very generous contributor, has already given \$200 of a pledged \$250. The Fund was

created by his fellow New Jersey alumni as a tribute to the memory of Dr. Harrington '10 who died on August 24, 1953. The Fund has rendered a valuable service to a host of appreciative students of the School who have been given temporary financial aid by the Fund.





### **MISS TOOMEY HONORED BY MOUNT SAINT MARY'S COLLEGE**

At the Sesquicentennial Convocation of Mount Saint Mary's College on April 12, Miss Katharine Toomey, Administrative Assistant of the School of Dentistry, was the recipient of the honorary degree of Doctor of Laws.

The citation represents a fine appreciation and a most suitable recognition of Miss Toomey's traits of character and her universally acknowledged status in relation to the students, the faculty, and the alumni of her beloved School:

"You are universally esteemed by faculty and students alike for your extraordinary talent of so shaping the lives of others that they might become useful, wanted individuals, distinguished by high aspirations and buoyant confidence.

"With easy grace and modest reserve you have been content to work your magic behind the scenes, finding your satisfaction in the bright careers which are the fruit of your devotion. The scores of men and women who have passed from the

University of Maryland Dental School bear the lasting imprint of your genuine kindness.

"Mount St. Mary's College graciously salutes you today for your open friendliness that reflects a selfless love of neighbor which all commend but few practice, and we proudly confer on you the honorary degree of Doctor of Laws, admitting you to all its rights and privileges."

The Convocation was attended by a large representation from the faculty group and by an impressively large delegation of alumni who traveled to the campus in Emmitsburg, Md., for the pleasure of witnessing the conferring of the academic honor on Miss Toomey, who has been a loyal friend and devoted supporter to the members of forty classes. It was particularly fitting that the award was made by a college that has prepared so many students for entrance to Maryland's School of Dentistry with which Miss Toomey has been affiliated since 1917.



## FIFTY YEARS OF ALPHA OMEGA FRATERNITY

The National Alumni Association congratulates the members of Alpha Omega Fraternity in recognition of the Golden Anniversary of the Fraternity that was celebrated in Baltimore, December 27-31.

In 1908 sixteen Jewish students from the three dental schools in Baltimore formed the Alpha Omega Dental Fraternity, one of the several Jewish dental school organizations that later united to form the international organization known as Alpha Omega Fraternity. Max W. Belzer '09 was the first President; Samuel M. Neistadt '10, Vice-President; William H. Rosenfeld '11, Treasurer; Solomon Feldstein '11, Financial Secretary; Jacob Solomon '10, Recording Secretary; and Maurice D. Liftig '11, Sergeant-at-Arms. Other charter members were Abraham Goberman '11, Morris Meyerson, Paul Steiner '09, David S. Robinson '10, Max Kahn '10, Charles Cohen, N. M. Bercovitz, Louis Levy '11, David Levin, Jacob M. Gordon '11, M. Sholkin, Julius M. Cornell '09, and Nathan P. Yolken '07.

The alumni of the Baltimore schools have continued throughout a half century to make vital contributions to the progress of their Fraternity. Our Alumni Records indicate that eight Maryland graduates have been elected to the highest office of Alpha Omega: Myron S. Aisenberg '22 (1935), Alvin H. Berman '21 (1926 and 1927), Meyer Eggatz '28 (1942 and 1943), Philip C. Lowen-

stein '28 (1949), Abraham H. Mendelsohn '14 (1928), Samuel M. Neistadt '10 (1923), Max E. Soifer '22 (1934), and Jesse Trager '34 (1956).

In 1923, the Fraternity established the Award for Meritorious Services. Among the thirty recipients of the Award are seven Maryland men: Myron S. Aisenberg '22 (1940), Alvin H. Berman '21 (1927), Meyer Eggatz '28 (1944), Philip C. Lowenstein '28 (1950), Jack W. Malkinson '21 (1925), Maurice J. Savitz '29 (1951), and Jesse Trager '34 (1948).

The Alpha Omega Achievement Medal, inaugurated in 1936, has been awarded eighteen times. Two of our graduates have been recipients of this outstanding award in the field of dentistry: J. Ben Robinson '14 (1941) and Myron S. Aisenberg '22 (1954).

Gerson Freedman '35, of Baltimore, was the Marshal of the Golden Anniversary Convention. He was supported very capably by others of our alumni: Phillip Block '33, national Sergeant-at-Arms; Jesse Trager '34, immediate Past President; Walter Levine '45, national Historian; Morton Goldiner '33, national Regent; and Edward Hoffman '44, President of the Baltimore Alumni Chapter. Walter Levine was Chairman of the National History Committee responsible for the publication of the **Fifty Year History of Alpha Omega Fraternity**. Milton B. Asbell '38 contributed a chapter to this volume.



## NEWS ABOUT OUR ALUMNI

By G. P. H. Foley

### Currie '52 Honored in Lowell, Mass.

On January 25 Dr. Leo Rodger Currie '52 received from the Greater Lowell Junior Chamber of Commerce its award as "The Outstanding Young Man of 1957." The award is made annually on the basis of the recipient's contribution to the community's welfare, his evidence of leadership, and his contributions to the business or professional life of the community. While President of the Lowell Dental Association in 1957, Dr. Currie was an important figure in the move to fluoridate the water supply of Lowell. He is a Director of the Chelmsford Bank and Trust Company, of which he was one of the original incorporators, and also a Director of the Chelmsford Drive-in Theatre. Dr. Currie served with the U. S. Marine Corps 1942-1945. He received his commission as Second Lieutenant at 19 and later received his Navy wings. He participated in 105 missions, including the invasion of Luzon and Mindanao. He received many decorations, among them the Distinguished Flying Cross with a star. Dr. Currie resides in Chelmsford with his wife, the former Patricia O'Dea, and their four children: Daniel 6, Gail 5, Susan 2, and Patricia 1.

### Maristany '18 and Lopez-Soto '46 Honored in Puerto Rico

A recent issue of the *Revista Dental*, publication of the College of Dental Surgeons of Puerto Rico, paid a fine tribute to Dr. Carlos F. Maristany, a member of the University of Maryland Class of 1918. A Past Pres-

ident of the College and a Fellow of the American College of Dentists, Dr. Maristany is described as one of the most valuable and substantial dentists of Puerto Rico. Since his graduation Dr. Maristany has been a most loyal alumnus and has brought a reflection of great personal respect and high professional standing to his alma mater.

In another issue the *Revista Dental* cited the outstanding professional status of Dr. Augustin Lopez-Soto '46—"dynamic defender of the dignity of the profession and enthusiastic participant in the social and civic activities of Arecibo." Dr. Lopez-Soto is a Past President of the Arecibo District Dental Society and Past Commander of his American Legion Post. He has practiced in Arecibo since his discharge from the Army in 1948.

### Ritter '92 Veteran Bank Official

Dr. Isaac L. Ritter, of the University of Maryland Class of 1892, celebrated his ninetieth birthday on February 28. Shortly before, he had been reelected Vice President of the Fidelity Savings Bank of Frostburg, Md., a position he has held since 1932. Dr. Ritter helped to found the bank in 1902 and is a half-century member of the Maryland Bankers Association. He recently retired as President of the Equitable Savings and Loan Society, an office he had held for over thirty years. Dr. Ritter was a pioneer in the development of Deep Creek Lake as a resort and served as Scoutmaster of the first troop of Boy Scouts organized in Frostburg. Dr. Ritter retired from



dental practice in 1943, after over fifty years of service to his community.

#### Zanner '55 on Georgetown Faculty

Dr. Albert W. Zanner, Jr. '55 is a member of the Operative Dentistry Staff of the Georgetown University Dental School. Following his graduation Dr. Zanner served in the U.S.A.F.

Dr. Sheldon Holen '55 has received an appointment, to begin July 1, as Assistant Resident in Medicine (Oral Medicine) at the Montefiore Hospital in New York City. Following his graduation Dr. Holen served two years in the Army, chiefly in Korea. On his discharge he entered the Post-graduate School of New York University for the study of Periodontia and Oral Medicine.

Dr. Louis Blum '57 has been stationed at Karlsruhe, Germany, since October. He reports that Dr. Wharton A. Nichols '54 is the Chief of the clinic to which he is assigned; Dr. Ervin E. Hunsuck '54 is stationed near Heidelberg; and Dr. Hubert T. Chandler '57 is at Stuttgart.

Dr. Barbara E. Seifert '54 was the subject of an article "Meet a Woman Dentist" published in the **Baltimore Evening Sun** of June 14, 1957. The article was one of a series on "A Girl and Her Job." Dr. Seifert has specialized in Pedodontia since 1955, when she returned to Baltimore after a year at the Eastman Dental Dispensary in Rochester, N. Y.

Dr. William L. Baugher '12 has practiced in his native city of Harrisonburg, Va., since graduation. Dr. Baugher has two pleasant hobbies, operating a small farm and playing

the clarinet. At seventy Dr. Baugher still plays and marches with the oldest band in this country, the Stonewall Brigade Band of Staunton, Va.

Dr. Albert R. Perrelli '54 is practicing in Damascus, Md. Dr. Perrelli served for two years in the Army, chiefly in Germany.

Dr. William A. Ingram '26 has been practicing in Monroe, N. C. since 1931. He had been engaged in the automobile business in Cheraw, S. C., during the period 1926-1931. Dr. Ingram is a charter member of the Lions Club of Monroe and a Past President.

Dr. Max Miller '39 has been practicing in Los Angeles, Cal., since 1947. Dr. Miller had practiced in Baltimore before entering the Army in 1942.

Dr. Michael E. Moran '24 has been practicing in Milford, N. H., since 1930. He had previously practiced in Portsmouth and Manchester. Dr. Moran is a veteran of World War I; he served for 22 months in France with the Yankee (26th) Division.

Dr. William J. Cirrito '43 (March) has practiced in Pearl River, N. Y., since his discharge from the U. S. P. H. S. in 1946. Dr. Cirrito is a Past President of the Rockland County Dental Society (1952) and the Lions Club (1953).

Dr. Reginald W. Cline '31 has practiced in Ellington, Conn., since 1954. Dr. Cline had previously practiced in Hartford.

Dr. Edward L. Knoebel '18 retired in 1946. Dr. Knoebel had practiced in Baltimore since 1918.

Dr. Richard A. Gretzkowski '48 began practice in Camden, N. J., in February 1956 after nine years of



service in the Air Force. He was separated with the rank of Major.

Dr. Ludolphus G. Page '29, of Yanceyville, N. C., has two interesting avocations. He has been a private flyer since 1942 and has his own flying field. He also manages a 450-acre farm on which he raises tobacco, grain, feeds, and cattle. Dr. Page is a Past President of the Third District Dental Society and a Past Master of his Masonic Lodge.

Dr. Raymond E. Phillips '35, of Warren, R. I., is a Past President of the Bristol County Dental Society (1952). Dr. Phillips served in the Army, 1953-55, chiefly in Munich, Germany as an Oral Surgeon for the Southern Area Command Headquarters.

Dr. Stuart M. Ratner '50, of Newark, N. J., began specializing in Orthodontics in 1954. He received his post-graduate training at Columbia University.

Dr. Harry M. Reid '32, of Lisbon Falls, Me., has been a member of the Board of Selectmen of the town of Lisbon since 1951. Dr. Reid is a Past Master of his Masonic lodge (1940).

Dr. Royal T. Whitney '50, of Milbridge, Me., was President of the Milbridge-Cherryfield Rotary Club, 1955-56. Since 1955 he has been Assistant Medical Director for Civilian Defense for Washington County. During World War II Dr. Whitney served in the Army Medical Corps, 1942-45.

Dr. Samuel H. Wilde, Jr., '27, of Belleville, N. J., is very active in three fields outside his professional activities. He is a member of the Newark Motor and Yacht Club, Cedar Grove Rod and Gun Club (three terms as President), Tri-County Camera Club, and the Photo-

graphic Society of America. He lectures on color and color processing and has acted as a judge of black and white salon prints at many exhibitions. Dr. Wilde also exhibits his own color slides and black and white prints.

Dr. Bruce N. Scidmore '46, of Corinth, N. Y., was President of the Saratoga County Dental Society, 1955-56. Dr. Scidmore served in the Army (1951-53) and was stationed in Germany.

Dr. Leo W. Sherwood '12 has practiced in Spokane, Wash., since his graduation. He is a Past President of the Spokane District Dental Society.

Dr. Alvin H. Simonson '52, of New London, Conn., has specialized in Oral Surgery since 1955. Following his graduation he studied for a year at the University of Pennsylvania School of Medicine. During the next two years he interned at Bellevue Hospital and was a Resident in Oral Surgery at the Metropolitan Hospital. Dr. Simonson has been a member of the citizens' organization to improve the public school system and of the committee to add sodium fluoride to the city's water supply.

Dr. John M. Ward '54 is specializing in Orthodontics, with offices in Elizabeth and Westfield, N. J. He did his postgraduate study at Columbia University. In World War II, Dr. Ward served in the U. S. N. Air Force.

Dr. Joseph A. Walker '52 began the specialized practice of Orthodontics in 1954, with offices in Anniston and Gadsden, Ala. He received his postgraduate training at the University of Tennessee. Dr. Walker, who is the son of Dr. Carlos A. Walker



'12, served in the Navy during World War II and has been in the Air Force Reserve since 1952. He presented a paper on "Extractions in Orthodontics" before the 1956 meeting of the Alabama Dental Association.

Dr. Carl V. Westerberg '38, who practices in New Britain, Conn., has the unusual side interest of growing Christmas trees on his farm in Avon. He has 7,000 trees growing and plans to have 5,000 more. Dr. Westerberg served in the Army (1943-46) during World War II and was separated as a Major.

Dr. John P. Mahoney '35, of Lowell, Mass., was President of the Lowell Dental Society in 1947-48 and of the Merrimack Valley Dental Society in 1948-49. Dr. Mahoney served in the Army from 1940 to 1946, and was separated as a Captain. He is the Chief of Dental Service at St. John's Hospital in Lowell.

Dr. Eugene W. O'Brien '10, of Lawrence, Mass., was Supervisor of School Dentistry for 40 years before reaching the retirement age in 1955. Dr. O'Brien played on the B. M. C. football team that defeated the Johns Hopkins eleven 6-5.

Dr. Frank J. O'Connor '29, of Norfolk, Va., has supplemented his professional activities by productive participation in fraternal and community affairs. Dr. O'Connor was Exalted Ruler, B. P. O. E. (1935); Grand Knight of the Norfolk Council, K. of C. (1941-46) and State Deputy (1952); President of the Torch Club (1953); President of the local chapter of the Izaak Walton League (1954-57); and President of the Norfolk U. S. O. (15 years).

Dr. John O. O'Meara '43 (March) has practiced in his home town of

Torrington, Conn., since his separation from the Navy in 1946. Dr. O'Meara has been a member of the Board of Education of Torrington since 1951.

Dr. Joseph L. Vajcovec '32, of Webster, Mass., is a Past President of the Lions Club and Past Grand Knight of the Knights of Columbus. Dr. Vajcovec is Chairman of two municipal committees: Finance and Parking and Traffic. A member of the Aircraft Owners and Pilots Association, he flies his own plane. Dr. Vajcovec served in the Army (1943-46) and was separated as a Captain.

Dr. Joseph L. Veniot '15, of Bathurst, N. B., Canada, has many interests outside the area of his profession. He is a Past Grand Knight and State Warden of the Knights of Columbus. Since 1937 he has been the organist of the Sacred Heart Cathedral and was formerly a member of the Community Band, Orchestra, and Glee Club. Dr. Veniot is a member of the staffs of the Hotel Dieu Hospital and the Vallee Lourdes Sanitorium.

### Personals

Dr. Edward V. Comulada '55 announces the opening of his office for the practice of general dentistry at 407 Boston Avenue, Takoma Park 12, Md.

Dr. Robert L. Wiener '55 announces the opening of his office at 2436 Washington Boulevard, Baltimore.

Dr. and Mrs. Alan A. Gale '50, of Irvington, N. J., announce the birth of a son, Adam Roy, on February 21. The paternal grandfather is Dr. Saul M. Gale '22.

Dr. R. James Vassar '52 announces the opening of his office for the prac-



tice of Orthodontics at 36 North Duke St., York, Pa. Following his discharge from the Army in 1956 Dr. Vassar entered the Graduate School of Northwestern University. He had practiced in Weston, W. Va., 1952-1954.

Dr. and Mrs. William E. Wolfel, Jr. '53, of Catonsville, Md., announce the birth of a son, David Allen, on January 3.

Dr. Edgar and Mrs. Edgar M. La Bar, Jr. '52, announce the birth of a daughter, Leslie Grace, on December 24, 1957. Dr. Edgar M. La Bar '19 is the paternal grandfather.

Dr. and Mrs. Jose R. Torres '50 of Yauco, P. R., announce the birth of a daughter, Lourdes Elmiro, on February 5.

Dr. and Mrs. Joseph F. Williams '55, announce the birth of a daughter, Sharon Anne, on February 26.

Dr. Fred Ehrlich '47 announces the opening of his office for the practice of Children's Dentistry in the Pikesville Medical Center, 1401 Reisterstown Road. Dr. Ehrlich has been an Instructor in Pedodontics at his alma mater since 1954.

Dr. Mitchell J. Burgin '49 announces the opening of his office at 57 Main Street, North Adams, Mass. for the specialty practice of Orthodontics.

### Obituary

Dr. Herbert Ferdinand Gorgas '91 (U. of Md.), of Baltimore, died on February 11. Born in Baltimore on November 21, 1870, Dr. Gorgas graduated from the Baltimore Polytechnic Institute in 1887. Dr. Gorgas had practiced for over a half century before his retirement. He was the

son of Dr. Ferdinand J. S. Gorgas '55 (B.C.D.S.), who served as Dean of the Baltimore College of Dental Surgery (1865-1882) and of the University of Maryland School of Dentistry (1882-1911). Dr. Gorgas's survivors include his wife, Mrs. Rosalie Hoffman Gorgas; two daughters: Mrs. Roger U. Ehrlich and Mrs. Louis S. Heim, of Baltimore; and a son, Herbert D. Gorgas, of Albany, N. Y. The death of Dr. Gorgas marks the end of the active alumni affiliation of the Gorgas family that had extended over more than a century.

Dr. Marion Norwood King '97 (U. of Md.), of Norfolk, Va., died on September 8. On his graduation Dr. King was awarded the University Gold Medal for Scholarship. In 1898 Dr. King graduated from the University of Maryland Medical School with honorable mention. During his professional career he practiced medicine exclusively. During World War I Dr. King served as Captain of a Service Battalion.

Dr. Charles A. Stine '23 (B.C.D.S.), of Baltimore, died on February 17. A native of Gilberton, Pa., Dr. Stine had practiced in Baltimore. He was a member of Xi Psi Phi. He is survived by his wife, Mrs. Gladys Evans Stine, and two sons: Joseph E. and Dr. Charles J. Stine, of the Class of 1950.

Dr. George H. McDonald '05 (B.C.-D.S.), of Neepawa, Manitoba, Canada, died recently. Dr. McDonald was a member of Xi Psi Phi.

Dr. Clement Anthony Zerdesky '28, of New Philadelphia, Pa., died on June 3, 1957. Dr. Zerdesky practiced in Tamaqua, Pa., from 1928 to 1942. He served in the Army Dental Corps 1942-1946, with assign-



ments in the European, African and Middle Eastern Theatres. On his separation with the rank of Major, Dr. Zerdesky began practice in New Philadelphia. He was a member of Psi Omega and the Gorgas Odontological Society. Among his survivors is a brother, Dr. Alfonse W. Zerdy '37.

Dr. John J. Fitzpatrick '12 (B. C. D. S.), of Boston, Mass., died on December 26. Dr. Fitzpatrick was a member of Psi Omega.

Dr. Clay Whitehill Leps '09 (B. C. D. S.), of Charles Town, W. Va., died on January 28. A native of Keyser, W. Va., Dr. Leps had practiced there for a brief period before removing to Charles Town. He was a member of Psi Omega. Surviving are his wife, Mrs. Ethel M. Leps; a daughter, Mrs. Harold Barr; and two sons: Clay W., Jr. and George Edwin III—all of Charles Town.

Dr. Howard Crosby Greene '11 (U. of Md.) died recently. He was a member of Psi Omega. Before his retirement, Dr. Greene had practiced in Hartford, Conn.

Dr. William Felton Deekens '92 (U. of Md.), of Wytheville, Va., died on January 11, 1956.

Dr. William L. Quitt '08 (U. of Md.), of Baltimore, died on January 25. A native of Russia Dr. Quitt came to this country as a young man. He had conducted a full-time practice up to the day of his death. Among his survivors are his wife, Mrs. Minnie E. Quitt, and a brother, Dr. Solomon L. Quitt '14 of Greenwich, Conn.

Dr. Israel Danker '09 (B. M. C.), of Baltimore, died on January 6. Dr. Danker is survived by his wife,

Mrs. Martha Nathanson Danker; a daughter, Mrs. George Steiner; and a son, Bertram Danker.

Dr. Harrison W. Schall '13 (B. C. D. S.), of Kittanning, Pa., died on January 18, 1956.

Dr. John Edward Plesko '24, of Scranton, Pa., died on April 13, 1956. Dr. Plesko was a member of Xi Psi Phi.

Dr. Abram M. Maimon '20 (U. of Md.), of Philadelphia, died on March 9, 1956.

Dr. Arthur L. Harvin '06 (B. C. D. S.), of Washington, D. C., died in December, 1957.

Dr. Thomas L. O'Connell '14 (B. C. D. S.), of Providence, R. I., died on November 25, 1957. Dr. O'Connell was a member of Psi Omega.

Dr. William James Beatty '92 (B. C. D. S.), of Butler, Pa., died on October 31, 1957.

Dr. Michael C. Jasielum '01 (B. M. C.), of Cambridge, Ohio, died on January 23.

Dr. Herbert W. Conrad '08 (B. C. D. S.), of Hackensack, N. J., died on February 2.

Dr. Ralph Lange '99 (B. M. C.), of Baltimore, died on December 23, 1957.

Dr. Floyd P. Edgell '05 (U. of Md.), of Charles Town, W. Va., died in June, 1957. Dr. Edgell was a member of Xi Psi Phi.

Dr. George Preston Green '21 (B. C. D. S.), of Richmond, Va., died on September 30, 1957.

Dr. Lloyd W. Mehaffey '19 (U. of Md.), of Washington, Pa., died on July 13, 1957. Dr. Mehaffey was a member of the Gorgas Odontological Society and Psi Omega.



Dr. Herman R. Eavey '95 (B. C. D. S.), of Hagerstown, Md., died recently.

Dr. Daniel Lynton Roland '21 (U. of Md.), of Reading, Pa., died on November 9, 1957. Dr. Roland was a member of Psi Omega.

Dr. S. Walter Longo '22 (B. C. D. S.), of East Port Chester, Conn., died on December 20, 1957. Dr. Longo was a member of Psi Omega.

Dr. Arthur A. Britowich '33, of Baltimore, died on February 9. Born in Orange, N. J. on July 21, 1909, Dr. Britowich came to Baltimore shortly after his graduation from the South Side High School in Newark. He was a member of the Gorgas Odontological Society and Sigma Epsilon Delta, and was a Past President of the Baltimore Alumni Chapter of S.E.D. Dr. Britowich is survived by his wife, Mrs. Sylvia Ulman Britowich; a daughter, Carol Lynn; and a son, Mark Samuel.

Dr. Leo James O'Hearn '13 (U. of Md.), of Pittsfield, Mass., died on November 22, 1957. Dr. O'Hearn interned at the Bellevue Hospital in New York before beginning practice in Pittsfield. In World War I he served as a First Lieutenant in the Army Dental Corps. He had been associated in practice since 1919 with his brother Dr. William J. O'Hearn, of the B. C. D. S. Class of 1916. A Fellow of the American College of Dentists, Dr. O'Hearn was on the staffs of St. Luke's and Hillcrest Hospital. He is survived by his wife, Mrs. Isabel Kelly O'Hearn; his brother; and his son, Dr. James W. O'Hearn '45, who has practiced the specialty of Oral Surgery in Champaign, Ill., since 1953. Recently

young Dr. O'Hearn removed to the Doctors Building near the University of Illinois campus. He had previously been associated with the Christie Clinic for several years.

Dr. Edwin P. Coolbaugh '20 (U. of Md.), of Ridgewood, N. J., died on November 5, 1957. Dr. Coolbaugh had practiced in Hackensack prior to his opening an office in Ridgewood in 1952. After taking a predental course at the University of Pennsylvania he enlisted in the United States Army for service in World War I. He served for 18 months in the Medical Detachment, 17th Infantry, 11th Division. Dr. Coolbaugh was a Past President of the Bergen County Dental Society and its Treasurer for many years. An enthusiastic sports fan, he had qualified as a race driver and later became an official timer of dirt track racing. He was a member of Psi Omega. Dr. Coolbaugh is survived by his wife, Anne Wulsteen Coolbaugh, and two children: Edwin Alden and Colette Coolbaugh.

Dr. Harry William Smith '23 (U. of Md.), of Washington, D. C., died on October 5, 1957. A native of Cumberland, Md., he was the son of the late Dr. Harry Elder Smith, of the B. C. D. S. Class of 1898. Dr. Smith was a member of Psi Omega.

Dr. George W. Young '23 (U. of Md.), of Harrisburg, Pa., died on February 24. A graduate of Millersville State Teachers College before entering Maryland, Dr. Young had practiced in Harrisburg since his graduation in dentistry. In World War I he served as a Second Lieutenant in the Infantry. He was a Past President of the Dauphin County Dental Society and was a member of



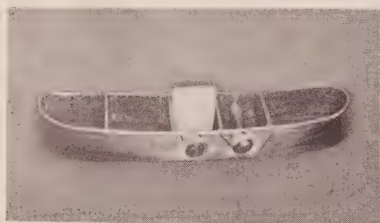
the Gorgas Odontological Society and Xi Psi Phi.

Dr. August Novak '15 (B. C. D. S.), of Baltimore, died on April 17. Dr. Novak had practiced for forty years before his retirement at the end of 1955. An outstanding athlete, he was sent to Prague in 1912 to represent the United States in an international gymnastic competition. Dr. Novak is survived by his wife, Mrs. Marie Huebelabout Novak, and two sons: Robert F., of Baltimore, and Richard A., of Cincinnati.

Dr. Harold B. Dumont '24, of Skowhegan, Me., died on April 1. Dr. Dumont was a veteran of World War I. He was a charter member and a Past President of the Lions Club. He had served his community as a member of the board of select-

men, overseer of the poor, and assessor. Dr. Dumont is survived by his widow and a son, Brian, of Skowhegan.

Dr. Augustine Pennington Badger '89 (U. of Md.), of Baltimore, died on April 1. Dr. Badger had practiced for sixty-one years up to his retirement on July 31, 1950. A pioneer in the field of institutional dentistry, he was associated with the Maryland Penitentiary during a period of forty-eight years. For several years following his graduation he served on the University of Maryland faculty as an Assistant Demonstrator. Dr. Badger is survived by a daughter, Mrs. John G. Chappell, of Brookeville, Md., and a son, Dr. Walter A. Badger, a member of the Class of 1926, of Birmingham, Ala.



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The latest important acquisition of the School's Museum was donated by Mr. G. Ward, a highly skilled dental technician of York, England. Mr. Ward last year contributed three replicas of obturators made by Pierre Fauchard. His most recent gift is a replica of an Etruscan prosthetic device (c. 1100 B. C.).

#### Faculty Members at A.A.D.S. Meeting

Dr. Myron S. Aisenberg and seven other members of the Faculty attended the annual meeting of the American Association of Dental Schools held in Detroit, March 23-26.

Dr. Joseph C. Cappuccio, Associate Professor of Oral Surgery, presented a paper on "The Management of Clinical Teaching of the Undergraduate Student in Oral Surgery." Mr. Gardner P. H. Foley, Professor of Dental Literature, presented a paper on "The Use of Library Resources in the Administration of the Course in Dental History" before the first Section on Dental History sponsored by the Association.

Also in attendance at the meeting were Drs. Robert Biddington, Joseph C. Biddix, William E. Hahn, Jose E. Medina, and Donald E. Shay.



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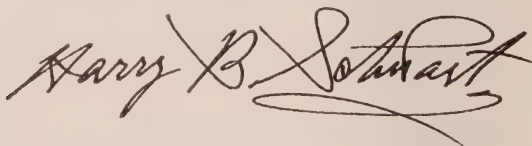
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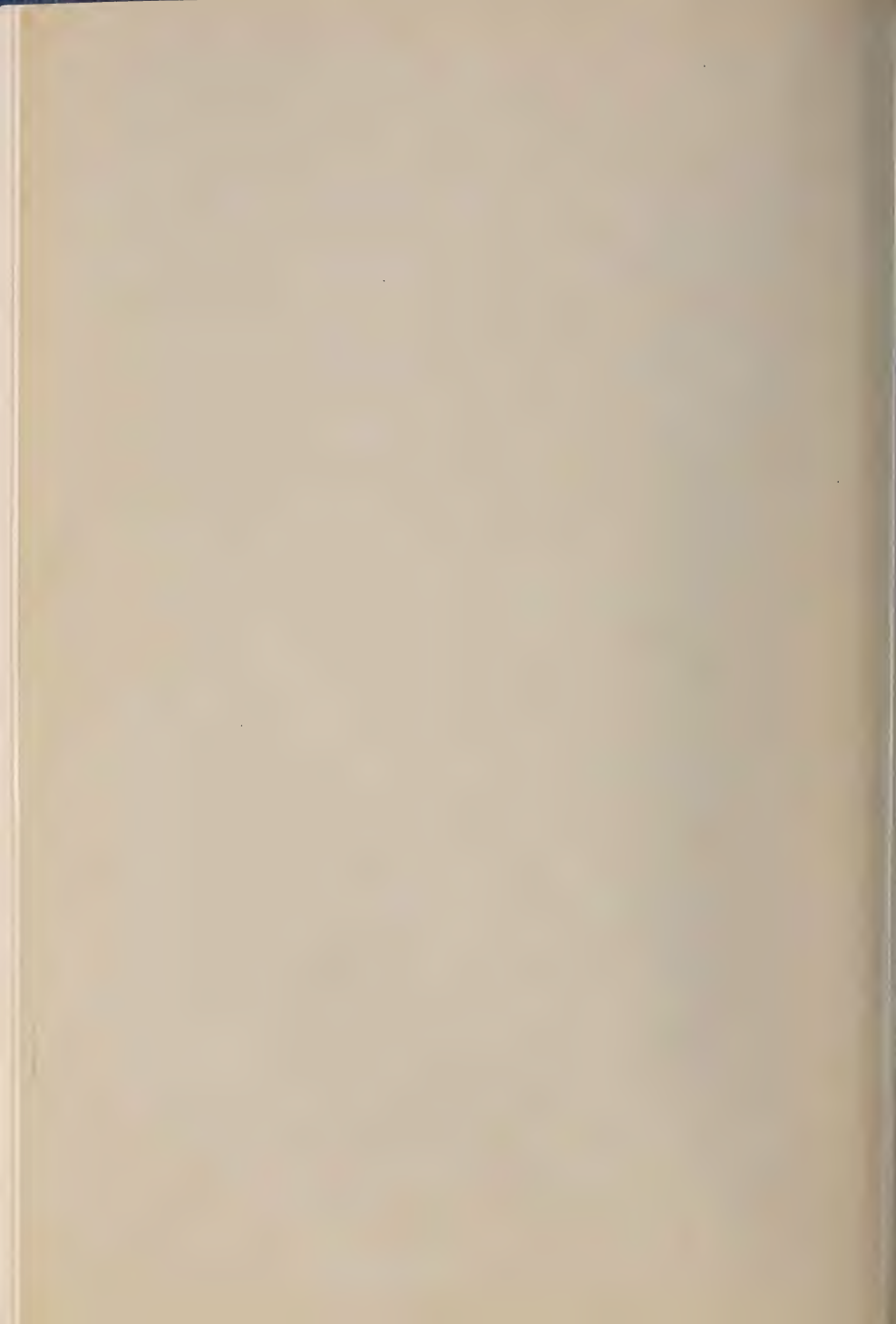
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## COMMENCEMENT PROGRAM

WEDNESDAY, JUNE SEVENTH

6:00 p.m.—Caswell Room, Lord Baltimore Hotel  
OMICRON KAPPA UPSILON (PHI CHAPTER)  
Banquet and Convocation

THURSDAY, JUNE EIGHTH

9:00 a.m.—Dental School  
Registration of Alumni

9:00 a.m.—Room 35  
Meeting of the Officers, Council, and Trustees of the Alumni  
Association

10:00 a.m.—Room 37  
Annual Business Meeting of the Alumni Association

2:00 - 4:00 p.m.—  
Scientific Program—Dedication of TV Presented by the Alumni  
Association to the Dental School

### REUNION DINNERS FOR CLASSES OF

|      |      |
|------|------|
| 1911 | 1936 |
| 1916 | 1941 |
| 1921 | 1946 |
| 1926 | 1951 |
| 1931 | 1956 |

Most of the five-year reunion classes will celebrate their anniversaries of graduation at dinners to be held on Thursday evening, June 8. The following alumni are in charge of the arrangements for the various reunions:

1911 B.C.D.S., B.M.C., and U. of Md.—C. Baker Ramsey.  
1916 B.C.D.S. and U. of Md.—Albert Z. Aldridge.  
1921 B.C.D.S.—Richard W. Schafer.  
1921 U. of Md.—Leonard I. Davis.  
1926 Harry Levin.  
1931 Ernest B. Nuttall.  
1936 H. B. McCauley, Jr.  
1941 J. Govane McClees.  
1946 Joseph P. Cappuccio.  
1951 Donald H. Hobbs.  
1956 Peter J. Lapolla.



**FRIDAY, JUNE NINTH**

- 9:30 a.m. - 12:00 noon—Lord Baltimore Hotel  
Academic and Awards Program
- 12:00 noon—Lord Baltimore Hotel  
Luncheon
- 2:00 p.m.—Chestnut Ridge Country Club  
Golf Tournament
- 7:30 p.m. - 1:00 a.m.—Chestnut Ridge Country Club  
Cocktails, Dinner and Dancing

**SATURDAY, JUNE TENTH**

Morning Graduation Exercises—College Park, Maryland

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8627 Liberty Road  
Randallstown, Md.  
Benjamin A. Williamowsky—1963  
1032 University Boulevard, East  
Silver Spring, Md.



## University Alumni Council Representatives

Samuel H. Bryant—1961

Medical Arts Building

Baltimore 1, Md.

Harry Levin—1962

5320 Park Heights Avenue

Baltimore 15, Md.

Edward D. Stone—1963

Medical Arts Building

Baltimore 1, Md.

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Arthur I. Bell—1962, Md.,

**Secretary-Treasurer**

W. Paul Hoffman—1961, D. C.

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Ashur G. Chavoor—1962, D. C.

Peter T. Kanelos—1963, R. I.

Jesse Trager—1963, Md.

## FAREWELL TO MISS TOOMEY

Ever since that important day in 1917 when Katharine Toomey began her affiliation with the University of Maryland's School of Dentistry, she has been adding to her stature as an exceptionally valuable contributor to the welfare of the School. At two other stages of her career—in 1942 and 1957—she received well merited appreciation and recognition from the students, the faculty, the alumni, and other units of the dental profession. On April 1, 1961 Miss Toomey will begin her retirement, after forty-four years of protean and dedicated service to the School that has been so dear to her heart.

Several thousand students have known Miss Toomey as a gracious, energetic, intelligent and helpful friend. From her they have received aid with their housing problems, practical advice and direction in solving their financial difficulties, and a tolerant and perceptive sympathy in her understanding of all the other

trials and tribulations that most dental students experience. The direct and indirect impacts of her well-remembered influence have created a host of reverential alumni for whom Miss Toomey has become a symbol of fond remembrance of their days at Lombard and Greene.

Miss Toomey's dependable sagacity and her intimate knowledge of all phases of the School's activities have made her a figure of immeasurable worth to the administrations of three deans: Timothy O. Heatwole, J. Ben Robinson and Myron S. Aisenberg. She has had a close affiliation with several hundred members of the faculty as the secretary of the Dean's Council, as the secretary-treasurer of the Faculty Assembly, and as a member of several faculty committees. But even more important to the faculty have been her devoted interest in their careers and the extension of her loyal friendship to include their wives and children. As one veteran



member of the faculty expressed it: "Miss Toomey now assumes a new identity as one who has achieved a niche in the history of the School. She can never be replaced, for, by the wonderful exercise of her interests and abilities, she created a position in this School that no other person could possibly fill."

In bidding farewell to Miss Toomey, we wish for her a continu-

ance of good health, and a rich measure of the pleasurable experiences that she will surely find during her retirement. We—and that includes her whole School family of forty-four years—say, "Bless your great heart, Miss Toomey, and may God give you the good years that you deserve to have. We shall always be delighted to see you whenever and wherever we may meet again."

## RESEARCH GRANTS AT THE SCHOOL OF DENTISTRY

A grant from the General Research Board of the University of Maryland is supporting in part research being conducted by the Department of Anatomy on the comparative histology of the sea lamprey gut from embryo to spawning adult. The department is also engaged in research on the creation of anatomical visual aids from paint and liquid plastic. This project is supported in part by Tri-Chem, Inc., West Orange, N. J. and The Castolite Company, Woodstock, Illinois.

The Department of Histology and Embryology is conducting cardiovascular research with the aid of two grants from the Society of Sigma Xi (\$150) and the General Research Board of the University (\$1,917). The department also has been given a grant of \$19,200 by the National Institutes of Health for the training of graduate students.

The Department of Microbiology has been awarded a series of grants (1959-1962) totaling \$19,500 for study of the isolation of pathogenic micrococci. This department also has

an industrial grant of \$7,000 for a study of the antimicrobial effects of Dequadin on oral bacteria.

The Department of Oral Surgery has received from the United States Public Health Service a grant of \$2,513 for an investigation of the hard and soft tissue tolerance of Ostamer. The project will evaluate the tolerance of oral tissue to implantation of Ostamer and determine the feasibility of reconstruction of the alveolar ridges with Ostamer.

The Department of Pathology has been awarded three grants: \$500 from the Society of Sigma Xi—"Experimental Lathyrism in the Syrian Hamster"; \$20,000 from the National Institute of Dental Research—"Morphologic, Histochemical and Histogenic Studies on Lathyrism"; \$12,000 from the United States Medical Research and Development Board—"Beta - aminopropionitrile - anorganic Bone in the Repair of Maxillofacial Wounds."

The Department of Pharmacology and Therapeutics has a grant from the Hoffman-La Roche Company for



a study of Tigan as an antigagging agent.

The Department of Physiology has received three grants: \$13,000 from the United States Army Chemical Research and Development Laboratories — "Investigation of the Mechanism of

Action of Ryanodine on Mammalian Skeletal Muscle"; \$12,500 from the National Institutes of Health — "Physical and Chemical Properties of ▲ Protein"; \$1,280 from the National Institutes of Health — Electromyography of the Major Jaw Muscle."

## NEWCOMERS TO THE FACULTY — DR. GARDNER AND DR. WHITE

Dr. Alvin Frederick Gardner was recently appointed Associate Professor in the Department of Pathology. He received the D.D.S. degree from Emory University, School of Dentistry in 1943. He attended the graduate school of the University of Illinois as a post-doctorate research fellow from the National Institute of Dental Research, National Institutes of Health. The University of Illinois awarded him the Master of Science degree with a major in pathology in 1957. He continued his education and training in pathology as a research fellow at the medical school of Georgetown University. The graduate school of Georgetown University awarded him the Doctor of Philosophy degree in 1959 with a major in pathology.

Dr. Gardner is listed in **American Men of Science** and **Who's Who in the East**. He is a member of the American Dental Association, International Association for Dental Research, and Sigma Xi. He has published 45 scientific articles, his research endeavors for the past seven years having been concerned with investigating the alterations in the oral and facial structures that result from the feeding of *Lathyrus odoratus*, the

flowering sweet pea, to Syrian hamsters.

Dr. Gardner married the former Esther Shochet in 1942 and is the father of an 11-year-old daughter, Ava Lee.

In July, 1960 Dr. John Irving White was appointed Professor and Head of the Department of Physiology to succeed the late Dr. Robert Oster.

Dr. White is a graduate of the University of Illinois and of Rutgers University, where he received the Ph. D. degree in biochemistry. He became associated with the University of Maryland School of Medicine in 1950 as a Research Associate, and in 1958 was appointed Associate Professor in the Department of Physiology of that school.

He holds membership in the American Physiological Society; American Chemical Society; American Association for the Advancement of Science; the Society of Experimental Biology and Medicine; the New York Academy of Sciences, to which he was elected a Fellow in 1960; and many other professional and scientific groups.



In addition to these activities, he has been actively engaged in research, particularly in the field of the physiology and biochemistry of skeletal, smooth and cardiac muscle. Dr. White has presented papers before a number of local and national organizations and has published numerous

articles in scientific journals. In 1958 he was the recipient of a Guggenheim Memorial Foundation Fellowship; during this period he conducted research in Germany and Belgium.

In 1946 Dr. White married the former Pauline Cutler and is the proud father of three children.

## THE POSTGRADUATE PROGRAM FOR 1960-61

The program was initiated with the presentation of a course entitled "Estate Planning for the Dentist." It was presented Sunday, October 9, 1960, in Room 10 of the Dental School and was attended by eighteen dentists. Four visiting lecturers participated, presenting material in areas of interest to the dentist planning his estate: Mr. James Price, "Stocks and Bonds"; Mr. John Enright, "The Role of Life Insurance in Estate Planning"; Mr. Wallace H. Campbell, "Real Estate as an Investment"; Mr. R. Carlton Sherretts, "Taxes—Problems of the Self-Employed." The registration fee was \$10.00.

On December 17, 1960, the Department of Operative Dentistry presented a course, "Restoration of Multiple Preparations," under the direction of the Department Head, Dr. José E. Medina, assisted by his staff, Dr. Sterrett P. Beaven, Dr. Henry J. Bianco, Dr. Hugh M. Clement, Dr. José H. Diaz, Dr. Calvin J. Gaver, Dr. Yam-hin Louie, Dr. Theodore J. Noffsinger, Dr. Edmond G. Vanden Bosche, and Dr. Francis A. Veltre. The course provided information related to the restoration of multiple preparations with amalgam and cast gold. The discussion on amalgam included atypical cavity designs, varia-

tions in retentive forms, use of temporary restorative materials, selectivity and construction of adequate matrices, and recent developments in the manipulation of the materials. The discussion on cast gold included extracoronary and intracoronary preparations, various methods in pattern development, investment and casting techniques, and factors influencing accuracy of the restoration. Fifteen dentists were in attendance. Registration fee was \$15.00.

On February 25 and 26, 1961, the Departments of Oral Medicine and Pathology presented "A Continuation Course in Endodontics 101." The course was under the direction of Dr. Irving Abramson, assisted by Dr. Alvin F. Gardner and Dr. J. Philip Norris. The course consisted of two days of study devoted to recent clinical advances in the field of Endodontics. It was planned for members of the dental profession who desired additional training in this clinical phase of dentistry. The course was so designed as to present a basic biologic background of those procedures which fall within the scope of Endodontics. Demonstrations of clinical techniques were presented. The lectures were augmented by slides, motion pictures and television.



The enrollment in the course was limited to twenty-five. Registration fee was \$25.00.

As the final presentation for this academic year a course in Pedodontics has been planned. This course will be under the direction of Dr. Douglas J. Sanders, Department of Pedodontics, and is scheduled for May 20 and 21, 1961. Two lecturers have been engaged to present the course—Dr. William S. Kramer of the University of Nebraska Dental School and Dr. Paul Sydow of Fram-

ingham, Massachusetts. The course will consist of lectures, seminars and table clinics. Registration fee for this course is \$35.00.

Announcements of the courses are sent to all alumni in the adjoining states. Graduates of other dental schools are contacted by mail through the secretary of their state association.

All communications relative to the postgraduate program should be directed to Dr. Donald E. Shay, Director, Postgraduate Division.

## NEW PROJECT IN TEACHING OF PEDODONTICS

A most unusual opportunity in dental education has recently been created in Baltimore. In September of 1960 the School of Dentistry and the Baltimore City Health Department joined in establishing a project to improve the dental health of the children living in the Western Health District. This project has two major purposes: first, it is concerned with the need for dental correction among the 25,000 school-age children of the District; second, it is concerned with the early and proper orientation of the dental student in the fields of Pedodontics and Public Health, under conditions utilizing the most modern equipment and technics.

The Western Health District building, on the northwest corner of Lombard and Penn Streets, was completed in 1960. It is an attractive two-story, reinforced concrete structure that blends with the buildings of the University's growing medical center. The newest of Baltimore's public health facilities, it is designed to

serve an area of 125,000 people, most of whom are classified as living in relatively low socio-economic circumstances.

The new building provides a dental clinic with five operating rooms, one of which is used by the Clinic Supervisor as a combination office and diagnostic and teaching area. The facilities also include a laboratory, a radiographic processing room, and adequate space for the reception of patients, administration, supervision and record keeping. Each operating room is equipped with conventional apparatus of the latest design, supplemented by 3 water turbine and 1 air turbine, high-speed handpieces, and the mobile cabinets within each room contain the instruments currently used by the students in the School's Pedodontics Clinic.

The Western Health District Dental Clinic is conducted to serve the complete dental needs of school children. The Clinic is administrated by the School's Department of Pedodontics



of which Dr. Douglas J. Sanders is the Director. Dr. Joseph J. Giardina, a full-time instructor, is assigned to supervise the Western Clinic and to coordinate the teaching philosophies of the School. The four chairs (excluding the diagnostic chair) are staffed by senior students who are assigned rotationally so that each student operates in the Clinic a minimum of 7 complete days. Thus the first dental college (1840) and the first department of health (1797)

have combined in making dental care available to the children of the Western District.

During the first 5 months (October-February) of the School's year over 800 pupils have been examined, 300 of whom are under treatment. There have been 1624 visits to the Clinic. Treatment services are as follows: radiographs, 2279; prophylaxis, 348; restorations, 1062; bases, 313 and anesthesia, etc., 108.

### STUDENT OFFICERS FOR 1960-61 YEAR

Senior Class: President, George F. Buchness, Baltimore; Vice-President, John F. Robinson, Baltimore; Secretary, Roy M. Naito, Koholo, Hawaii; Treasurer, Gilbert S. Berman, Baltimore; Historian, Sheldon G. Gross, Springfield, Mass.; Sergeant at arms, David B. Pere, Miami Beach, Fla.; Student Senate Representatives, Donald A. M. Brown, Landover Hills, Md. and Frank J. Sinnreich, Jr., Baltimore.

Junior Class: President, Robert R. Parker, Cumberland, Md.; Vice-President, John C. Wilhelm, Cardiff, Md.; Secretary, Richard F. Downes, Laurel, Md.; Treasurer, Leo Rabago, Jr., Fresno, Calif.; Historian, Laddie L. Jones, Simpsonville, S. C.; Sergeant at Arms, Jack A. Roth, Oakland, Md.; Student Senate Representatives, John Thomson, Kearny, N. J. and James E. Andrews, Newton, N. C.

Sophomore Class: President, Donald R. Yent, Baltimore; Vice-President, Thomas M. Darrigan, Merrick, N. Y.; Secretary, Della Ruth Looper,

Scottsville, Va.; Treasurer, Fred M. Scholnick, Baltimore; Sergeant at Arms, Loren G. Maser, Washington, D. C.; Student Senate Representatives, Dean C. Johnson, Bountiful, Utah and Herbert A. Wolford, Wilmington, Del.

Freshman Class: President, John F. Patterson, Baltimore; Vice-President, John R. Savoia, Ludlow, Mass.; Secretary, John P. Hackett, Woodstown, N. J.; Treasurer, David L. Mincey, Charlotte, N. C.; Student Senate Representatives, Gary K. Gold, Baltimore and Wayne L. O'Roark, Chevy Chase, Md.

Alpha Omega: President, Erwin S. Raffel, Baltimore; Vice-President, Stanley M. Stoller, Baltimore; Secretary, Ronald H. Israel, Baltimore; Treasurer, Malcolm S. Renbaum, Baltimore; Assistant Treasurer, Sidney S. Markowitz, Silver Spring, Md.; Chaplain, Morris Antonelli, Kensington, Md.; Historian, Paul I. Teitelbaum, Baltimore; Sergeant at Arms, Joseph D. Mechanick, Baltimore;



House Manager, Samuel Blum, Washington, D. C.

Psi Omega: Grand Master, John H. Swann, Baltimore; Junior Master, Joseph A. Sullivan, Miami, Fla.; Secretary, Arthur H. Streeter, Los Angeles, Calif.; Treasurer, John F. Robinson, Baltimore; Pledge Master, George B. Towson, Baltimore; Editor, William H. Dickson, Hyattsville, Md.; Historian, Joseph M. Pistoria, Irvington, N. J.; House Manager, A. Stewart Windeler, Madison, N. J.; Social Chairman, Donald M. Tilghman, Pocomoke City, Md.

Sigma Epsilon Delta: President, Melvin Goldenberg, Hempstead, N. Y.; Secretary, Sol B. Love, Wash-

ington, D. C.; Treasurer, Ralph L. Kroopnick, Hartford, Conn.; Chaplain, Barry S. Buchman, Baltimore; Inner Guard, Douglas Kaplan, Teaneck, N. J.; Outer Guard, Michael C. Matzkin, Waterbury, Conn.

Xi Psi Phi: President, Lawrence L. Clark, Longport, N. J.; Vice-President, Douglas A. Bryans, Hampden, Mass.; Secretary, Dennis M. Sullivan, N. Augusta, S. C.; Treasurer, Jack E. Liller, Baltimore; Co-historians, Sanford K. Kamezawa, Lihue, Kauai, Hawaii and Lawrence A. Gallerani, Agawam, Mass.; Sergeant at Arms, John F. Zulaski, Torrington, Conn.; Chief Herald, Donald A. Romeo, North Adams, Mass.

## ALUMNI SONS AT THE SCHOOL OF DENTISTRY

During the long history of the Baltimore dental schools scores of graduates have demonstrated their loyalty to and respect for their alma mater by sending their sons to their old school. The present student body contains thirteen sons of alumni: 3 freshmen, 1 sophomore, 4 juniors, and 5 seniors. The roster presented below lists the sons and their fathers, with the designation of the Class of each.

Class of 1961: William Paul Hoffman, Jr. (William Paul Hoffman '27); Douglas Kaplan (Irwin B. Kaplan '28); Richard M. Marrone (James

Marrone '27); Michael C. Matzkin (Max N. Matzkin '29); George B. Towson (Donald H. Towson '42).

Class of 1962: George G. Clendenin (George B. Clendenin '29); Howard E. Schunick (William Schunick '34); Alan T. Trager (Jesse Trager '34); John C. Wilhelm (Paul Wilhelm '25).

Class of 1963: John D. Bimestefer (Lawrence W. Bimestefer '34).

Class of 1964: Wayne L. O'Roark (George E. O'Roark '49); Merwin A. Todd III (Merwin A. Todd, Jr. '33); Theodore T. Wycall (Theodore L. Wycall '34, deceased).



## FACULTY ACTIVITIES

(This is a report on the varied activities of the faculty members during 1960.)

Dr. Myron S. Aisenberg, Dean, appeared on several programs: January 11, "Oral Malignancies," Delaware State Dental Society, Wilmington; February 3, "Cancer of the Mouth," V. A. Hospital, Baltimore; March 8, "Benign Tumors of the Mouth," General Hospital, Wilmington, Del.; April 18, "Oral Soft Tissue Lesions," Harford-Cecil County Dental Society, Aberdeen, Md.; April 28, "Development of an Ameloblastoma in a Globulo-maxillary Cyst," American Academy of Oral Pathology, Chicago; May 6, Seminar on Oral Cancer, West Virginia University; September 14, "Oral Cancer," Luzerne County Dental Society, Wilkes-Barre, Pa.; September 15, "Ankylosis and Enostosis," Middle Atlantic Society of Oral Surgeons, Washington; October 5, "Oral Cancer," Sixth District Dental Society, Williamsport, Pa.; November 17, "Oral Cancer," Allegheny-Kiski Dental Society, New Kensington, Pa.; February 15, "Oral Soft Tissue Lesions," V. A. Hospital, Brockton, Mass. He collaborated in two papers published in the November issue of **Oral Surgery, Oral Medicine, and Oral Pathology**: "Ameloblastoma Arising Within a Globulo-maxillary Cyst" and "Osteoma of the Mandible." Dr. Aisenberg is Vice President of the American Board of Oral Pathology.

Dr. José E. Medina, Professor of Operative Dentistry, presented several papers: February 2, "Amalgam: Its Need and Value in Dentistry,"

Walter Reed Army Medical Center, Washington; February 23, "A Clinical Evaluation of Advanced Speeds," Baltimore County Dental Association, Baltimore; May 5 and 6, "Fundamentals of Gold Foil Manipulation," "Mat Gold Restorations," "Class III Restorations," New England Study Club of Dentistry, Boston; August 23, "Amalgam Restorations," Walter Reed Medical Center; September 27, "Recent Developments in Operative Dentistry," Fourth District Dental Society, Raleigh, N. C.; October 26, "Accelerated Speeds in Dentistry," New Jersey Alumni Association, Newark; November 18 and 19, "Class V Restorations," New England Study Club of Dentistry, Boston; December 8, "A Clinical Evaluation of Advanced Speeds," USPHS Hospital, Baltimore. Dr. Medina presented a postgraduate course in Operative Dentistry at the Universidad de San Carlos, Guatemala City, Guatemala (September 8-13). He was Director of the postgraduate course on "The Restoration of Multiple Preparations" given at the University of Maryland on December 17. Dr. Medina's other activities include these offices: editor, **Journal of the American Academy of Gold Foil Operators**; consultant, USPHS Hospital, Baltimore; Chairman of Program Committee, Maryland State Dental Association; Alumnus Advisor, Alpha Lambda Chapter, Kappa Alpha Order; and Worshipful Master, Tuscan Lodge No. 202.

Dr. Alvin F. Gardner, Associate Professor of Pathology, contributed "Recent Discoveries in Dental Research" to the September number of the **Journal of the Maryland State**



**Dental Association** and collaborated in "Osteoma of the Mandible," published in the November issue of **Oral Surgery, Oral Medicine, and Oral Pathology**.

Dr. Douglas J. Sanders, Associate Professor of Pedodontics, presented three papers: February 8, "Fractured Incisors," Bergen County Dental Society, Hackensack, N. J.; April 24, "The Complete Examination for the Child Patient," Virginia Society of Dentistry for Children, Richmond; May 9, "Principles and Practice of Dentistry for Children," Temple University School of Dentistry. Dr. Sanders collaborated in writing "Pulp Conservation with an Antibiotic Agent" (**Journal of Dentistry for Children**, First Quarter). He is vice-chairman of the Council on Dental Health, Maryland State Dental Association and consulting pedodontist of the Child Evaluation Clinic, University of Maryland Pediatric Department. He was chairman of the Semi-Annual Meeting of the Maryland S. D. A., held September 18-20. Dr. Sanders is a member of the Maryland Joint Council to Improve the Health Care of the Aged. In a television appearance on February 18, he discussed "Nutrition and Diet in Dentistry."

Dr. William E. Hahn was reappointed consultant to the Council on Dental Education. At the June meeting of the Maryland Section of the American College of Dentists he spoke on "The Dental Aptitude Testing Program." As a member of the Committee on Teaching of the American Association of Dental Schools, he attended July and August meetings in Washington, D. C., to assist in developing plans for a Teachers

Institute in the Biological Sciences to be held in the fall of 1961. In February Dr. Hahn attended the Congress on Dental Education and Licensure, and also participated in a symposium on "The Reactions and Opinions of the Dental Schools to Aptitude Testing," sponsored by the American Association of Dental Examiners at Loyola University in Chicago.

Dr. E. Roderick Shipley, Associate Professor of Physiology, appeared on three programs: "Newer Drugs in Anesthesia," Maryland State Society of Anesthesiologists; "Lesions of the Intestinal Tract," Howard County (Md.) Medical Society; "Cancer Prevention," Ellicott City Lions Club. Dr. Shipley is a member of the Executive Board of the Baltimore City Medical Society and was elected a Fellow of the Society of Abdominal Surgeons.

Dr. Conrad L. Inman, Assistant Professor of Anesthesiology, collaborated with Drs. Aisenberg and Gardner in "Osteoma of the Mandible" published in the November issue of **Oral Surgery, Oral Medicine, and Oral Pathology**.

Dr. Charles E. Loveman, Instructor in Anatomy, attended the meeting of the American Society of Oral Surgeons in Phoenix, Ariz., and the meeting of the American College of Dentists in Los Angeles, at which he was made a Fellow. He published two papers: "Analgesic Tests in Oral Surgery Practice" (**J. of the Indiana State Dental Association**) and "The Sinai Hospital Dental Department" (**J. of the Maryland State Dental Association**). In February he lectured on "Local Anesthesia and Anatomy" before the Lancaster County (Pa.) Dental Society. Dr. Loveman is Chief



of the Dental Department at Sinai Hospital and the North Charles General Hospital.

Dr. Brice M. Dorsey, Professor of Oral Surgery, appeared on the program of the Maine Dental Society, held at Rockland on June 16-17. He presented a paper on "Oral Surgery in the Dental Office" and a clinic on "Preoperative, Operative, and Post-operative Care and Medication of Surgery Patients." Dr. Dorsey participated in the Third Conference on Graduate Education in Oral Surgery sponsored by the American Society of Oral Surgeons in Chicago on November 28. He also participated in the Advanced Institute on Hospital Dental Service held in Chicago on December 1.

Dr. Conrad C. Ferlita, Instructor in Pedodontics, presented two clinics: "Preventive Orthodontics," Philadelphia unit of the Pennsylvania Society of Dentistry for Children; "Tooth Guidance," Maryland State Dental Association annual meeting, Atlantic City.

Dr. Wilbur O. Ramsey, Professor of Dental Prosthesis, was an essayist at several meetings: January 19, "Partial Denture Concepts and Practices," Lancaster County (Pa.) Dental Society; October 20, "Biomechanical Aspects of Removable Partial Denture Construction," Richmond (Va.) Dental Society; November 15, "Planning Partial Dentures," Hanover (Pa.) Dental Society. He presented a paper, "Clinical Interpretation and Treatment of Temporomandibular Joint Disorders," and a clinic, "Mouth Preparation for Removable Partial Dentures," at the Maine Dental Society meeting on June 17. On February 4 Dr. Ramsey addressed

the Hampstead (Md.) Rotary Club on "Hypnosis, a Medico-Dental Aid." He served as Program Chairman of the Md. S. D. A., is a Consultant to the USPHS Hospital in Baltimore, and is a member of the Executive Council of the Baltimore City Dental Society.

Dr. George W. Piavis, Assistant Professor of Anatomy, contributed "Embryological Stages in the Sea Lamprey and Effects of Temperature on Development" to the *U. S. Fish and Wildlife Service Bulletin* 182 and "Report on a Paint Insoluble in Liquid Plastic" to *Turtlox News* (February). In March he presented a demonstration of "Visual Aids Created with Paint and Plastic" at the meeting of the American Association of Anatomists at Chicago. An abstract of this demonstration was published in *The Anatomical Record* (February).

Mr. Gardner P. H. Foley, Professor of Dental Literature and Dental History, is Vice-President of the American Academy of the History of Dentistry and a member of the Constitution and Bylaws and the Program committees. He continues as the initiatory chairman of the M. D. K. Bremner Award Contest sponsored by the Academy. He is in his second term as a member of the Editorial Board of the *Journal of Dental Education* and is consulting editor of the *Journal of the American Academy of Gold Foil Operators*. Mr. Foley presented a paper on "The Dentist in Literature" before the April meeting of the Baltimore Chapter of the I.A.D.R.

Dr. Paul A. Deems, Instructor in Clinical Orthodontics, collaborated with Dr. George M. Anderson in the



ninth edition of **Practical Orthodontics**.

Dr. Marvin M. Graham, Assistant Professor of Fixed Partial Prosthesis, discussed "Audio Analgesia" before several groups: October 17, Alpha Omega Alumni; October 24, Sinai Hospital Dental Staff; November 8, Westminster (Md.) Study Group; November 14, Audioc Study Club; November 16, Sigma Epsilon Delta Alumni; December 7, Alleghany County (Md.) Dental Society, Cumberland; December 20, Hanover (Pa.) Dental Society. On May 23 Dr. Graham discussed "Functional Anatomy of the Temporomandibular Joint" at Sinai Hospital and in June discussed "Audio Analgesia" in two appearances on WBAL-TV.

Dr. Ernest B. Nuttall, Professor of Fixed Partial Prosthesis, has achieved the reputation of being one of the leading clinicians and essayists in the profession. Dr. Nuttall presented papers, illustrated lectures, and clinics before meetings in 9 states and the District of Columbia: February 3, "Abutment Preparations Using High Speed Instruments," Philadelphia County Dental Society; February 6, "Factors Influencing Success of Porcelain Jacket Restorations," American Academy of Crown and Bridge Prosthodontics, Chicago; March 2, "Fundamental Biophysical Factors in the Construction of Pontics for Fixed Restorations," Walter Reed Army Institute of Research, Washington; March 7, "Present Concepts in Fixed Prosthodontics," Southern Maryland Dental Society, Silver Spring; March 8, "Ultra Speed Operations in Crown and Bridge Prosthesis," Greater Philadelphia Meeting; March 15, "Fixed Remov-

able Prosthesis," Washington County Dental Society, Hagerstown, Md.; April 6, "Current Concepts in Fixed Prosthodontics," American Academy of Dental Science, Boston; June 17, "Present Concepts in Fixed Prosthodontics" and "Aids in Restorative Dentistry," Maine Dental Society, Rockland; August 26, "Clinical and Technical Aspects of Restorative Dentistry," Walter Reed Army Medical Center; October 26, "Abutment Preparations Using High Speed Instruments," New Jersey Alumni Association, Newark; November 3, "Present Concepts in Fixed Prosthodontics" and "Management of Routine Problems in Restorative Dentistry," Fifth District Dental Society, Oswego, N. Y.; November 21, "Present Concepts in Fixed Prosthodontics," V. A. Hospital, Wilkes-Barre, Pa. He also discussed this last subject on December 5 before the Lincoln District Dental Society and on December 6 before the Omaha District Society. In a post-graduate course in Crown and Bridge Prosthodontics offered at the Medical College of Virginia, February 22-24, Dr. Nuttall presented a series of lectures on "Some Important Considerations in the Construction of Pontics for Fixed Restorations." He attended the Central Area Conference on Aging held at the Baltimore City Hospitals on May 18 and the Governor's Conference on Aging held at College Park, September 7-8. Dr. Nuttall is an Area Consultant in Dentistry to the Area Medical Office of the V. A., Trenton, N. J. and is Consultant to the Council on Dental Health of the Maryland S. D. A.

Dr. Edward C. Dobbs, Professor of Pharmacology and Therapeutics, appeared on these programs: February



9, "Carbocaine the New Local Anesthetic" and February 10, "Resuscitation in the Dental Office," Chicago Dental Society; April 9 and 10, "Pharmacy-Dental Relations," School of Pharmacy, University of Maryland; September 19, "Prevention and Treatment of Dental Emergencies," Third District (N. C.) Dental Society, Sedgfield. Dr. Dobbs, singly and in collaboration, contributed four articles to the literature: "What Should Be the Content of Our Teaching Methods for a Laboratory Course in Pharmacology for Dental Students," **Journal of Dental Education**, March; "Clinical Evaluation of Sulfadimethoxine" (with Dr. Joseph P. Cappuccio, Associate Professor of Oral Surgery), **Journal of Oral Surgery, Anesthesia and Hospital Dental Service**, May; "Cross-Infection and the Disposable Dental Needle (with Dr. Frank A. Dolle, Instructor in Pharmacology), **Journal of Dental Medicine**, January; "A Preliminary Study on Carbocaine" (with Dr. Norton M. Ross, Assistant Professor of Pharmacology), **Journal of the American Dental Society of Anesthesiology**, November.

Dr. Norton M. Ross, Assistant Professor of Pharmacology, in addition to his collaboration with Dr. Dobbs, presented a paper on "Clinical Evaluation of a New Local Anesthetic, Carbocaine" before the Baltimore Chapter of the I.A.D.R. on April 26. Dr. Ross was elected to membership in Omicron Kappa Upsilon and to the offices of Master of the Maryland Graduate Chapter of Sigma Epsilon Delta and Secretary-Treasurer of the Maryland-District of Columbia Section, American Academy of Medicine.

Dr. D. Vincent Provenza, Professor

of Histology and Embryology, collaborated in "Studies on the Etiology of Periodontosis II Glomera as Vascular Components in the Periodontal Membrane" (**Oral Surgery, Oral Medicine and Oral Pathology**, February) and "A Simplified Parlodion Method for Sectioning Teeth; with Notes on the Decalcification of Teeth" (**Transactions of the American Microscopical Society**, January). He participated in the N.I.H. Graduate Training Program held at Western Reserve University, July 18-19. Dr. Provenza is president of the Maryland Biological Society, 1960-61.

Dr. Donald E. Shay, Professor of Microbiology, contributed "The Comparative Fermentation of Polyhydric Alcohols in Saliva from Caries Susceptible and Nonsusceptible Mouths" (**Dental Digest**, January); he collaborated in "A New Concept in the Evaluation of Sterilizing Agents Used in Endodontics" (**Journal of Dental Medicine**, January), "The Isolation of Certain Types of Micrococci from Dental Students and Related Antibiotic Studies" (**Journal of Dental Research**, January - February), and "Pulp Conservation with an Antibiotic Agent" (**Journal of Dentistry for Children**, First Quarter). Dr. Shay served as chairman of the Conference on Microbiology at the American Association of Dental Schools meeting held in Chicago in March. He is president of the Baltimore Section of the I.A.D.R.; Councilor for Maryland and chairman of the Membership Committee, American Society for Microbiology; and chairman of the Technical Committee, Joe Berg Foundation, a national organization for the promotion of scientific education among gifted students in secondary schools.



Dr. Kyrle W. Preis, Professor of Orthodontics, is president of the Middle Atlantic Society of Orthodontists; chairman of the Judicial Council and member of the Board of Governors, Maryland S. D. A.; and deputy regent, International College of Dentists. He represented the Middle Atlantic Society of Orthodontists at the American Society of Orthodontists' International Meeting held in Washington, April 24-27. He is the editor of *Alma Mater* and the School of Dentistry editor of *Maryland Magazine*. Dr. Preis presented "Childhood Oral and Facial Habits" (motion pictures and table clinics), Maine Dental Society, June 17; a postgraduate course in "Childhood Dental Problems with Particular Reference to Factors Which Favorably or Unfavorably Affect Facial Development and Dental Occlusion," Connecticut State Dental Association, Hartford, October 26; and "Childhood Dental Problems Which Affect Facial Development and Dental Occlusion" (motion pictures and slides), USPHS Hospital, Baltimore, April.

Dr. Arthur G. Siwinski, Assistant Professor of Oral Surgery, gave several talks on cancer under the sponsorship of the American Cancer Society: February 18, Baltimore Metropolitan Pharmaceutical Association; February 23, Women's Club of Glen Hill; May 23, Parents and Friends of the Sacred Heart School; and September 27, Women's Group of the Rogers Avenue Synagogue.

Dr. Frank A. Dolle, Instructor in Pharmacology, besides his collaborative work with Dr. Dobbs, joined with Dr. John M. Foley, Instructor in Histology, in presenting a table clinic on "Medical Emergencies in the Den-

tal Office" at the June annual meeting of the Maryland S. D. A., in Atlantic City. Dr. Dolle is associated with the Baltimore County Public Health Department as Visiting Dentist to the Lutherville Elementary School.

Dr. Samuel H. Bryant, Instructor in Oral Diagnosis, is president of the Baltimore City Dental Society. He has been treasurer of the Maryland S. D. A. since 1946.

Dr. Irving I. Abramson, Assistant Professor of Oral Medicine, presented seven papers: January 21, "Endodontics: An Aid in Crown and Bridge Therapy," Eastern Dental Society, Philadelphia; February 5, "Value of the Culture Technique as a Routine Procedure in Endodontic Treatment," American Association of Endodontists, Chicago; February 14, "The Role of Endodontics in the Practice of Dentistry," Eastern Shore Dental Society, Easton, Md.; February 18, "Diagnosis and Treatment Planning in Endodontics," Bridgeport (Conn.) Dental Association; February 28, "Endodontics: An Aid to Crown and Bridge Therapy," Baltimore County (Md.) Dental Society; April 24, "Endodontics: An Aid in the Practice of Dentistry," Virginia State Dental Association, Richmond; May 17, "Traumatic Injuries to Teeth—Ages Six to Sixty," Hanover (Pa.) Dental Society. He gave a registered clinic on "Traumatic Injuries to the Teeth—Ages Six to Sixty" at the Greater Philadelphia Meeting, March 8-9. Dr. Abramson participated in the Pacific Seminars presented in November under the aegis of the Postgraduate Department of the School of Dentistry, University of California: "Traumatic Injuries to Teeth—Ages



Six to Sixty," Japanese Dental Society (Tokyo) and the Hong Kong Dental Association; "Pulpotomy Technique," Kyoto (Japan) Dental Association; "The Role of Endodontics in the Practice of Dentistry," Bangkok (Thailand) Dental Association. He is a member of the Board of Governors of the Maryland S. D. A. and of the Executive Board of the American Association of Endodontists.

Dr. J. Philip Norris, Assistant Professor of Oral Medicine, contributed "The Preparation of Teeth for Endodontic Therapy" to the September issue of the *Journal of the Maryland State Dental Association*. He collaborated

with Dr. Cappuccio and Dr. Dobbs in a table clinic on "The Sulfonamides in Dentistry" at the Md. S. D. A. meeting in June and collaborated with Dr. Abramson in a projected clinic on "An Endodontic Method for Retaining Teeth Fractured Within the Alveolus" at the meeting of the American Association of Endodontists held at Chicago in February. In June he was elected to membership in Omicron Kappa Upsilon. Dr. Norris is a member of the Executive Council of the Baltimore City Dental Society and is chief correspondent of the *Journal of the Md. S. D. A.*

### FROM THE RANKS OF THE FILE

The Alumni File is a rich source of information about the graduates of the Baltimore dental schools. It is the particular purpose of this column to illustrate in various ways the worth of the File as an extremely valuable repository of recorded knowledge that reflects the splendid reputation established and maintained by the world's first dental college and the three other dental colleges that now are historically unified under the name of the Baltimore College of Dental Surgery, Dental School, University of Maryland. Despite the immense research effort that has been given to the construction of the File, it is an obvious fact that research of this nature is a continuing project; therefore, the elements of information presented here are based on present knowledge that may not be final knowledge.

The first man to receive the D. D. S. degree was Robert Arthur, who graduated from the B. C. D. S. in

1841. One of dentistry's immortal figures, Arthur achieved international fame as an educator, as a writer, and as a contributor to the progress of dental practice. The most recent graduate of our School is Louis Yarid '60, now practicing in Lowell, Mass., his home city. Yarid, a graduate of Columbia University, was president of the Xi Psi Phi chapter.

The first card in the File is that of Alvin I. Aaron '38, who is practicing in Biddeford, Me. The last card is that of Andrew Zwick '26, who came to Maryland from Naugatuck, but practices in New Britain, Conn.

It is definitely known that 21 alumni have been elected to the office of mayor: Charles Evers Beall '98 (U. of M.)—Ansted, W. Va.; James Boyce Bigham '84 (U. of M.)—Blackstock, S. C.; Charles Alberto Bland '92 (B. C. D. S.)—Charlotte, N. C.; Harvey J. Burkhart '90 (B. C. D. S.)—Batavia, N. Y.; Ralph Derby Craw-



ford '18 (B. C. D. S.)—Monroe, N. Y.; Civilion Fones '77 (Maryland D. C.)—Bridgeport, Conn.; John Harrington Hamer, Jr. '03 (U. of M.)—Dillon, S. C.; William J. Koelz '04 (U. of M.)—Keyser, W. Va.; Harry Clifton Leib '04 (U. of M.)—Easton, Md.; William Ernest McIntosh '13 (U. of M.)—Lynchburg, S. C.; Simon G. Markos '37—Dover, N. H.; William E. Minghini '93 (U. of M.)—Martinsburg, W. Va.; J. T. Nock '13 (B. C. D. S.)—Pocomoke, Va.; Gustavus North '82 (B. C. D. S.)—Springville, Iowa; Fred Wilbur Parsons '53—Pocomoke City, Md.; Elmer Ernest Richardson '00 (B. C. D. S.)—Leaksville, N. C.; Russell Phillips Smith, Jr. '43—Cambridge, Md.; Mordecai Gist Sykes '82 (B. C. D. S.)—Ellicott City, Md.; Robert Lee Thacker '98 (U. of M.)—Franklin, W. Va.; William Washington Hackett Thackston '42 (B. C. D. S.)—Farmville, Va.; Gordon Belden Tison '97 (B. C. D. S.)—Gainesville, Fla.; Seymour B. Ward '87 (B. C. D. S.)—Belle Haven, Va.

Fifteen of our graduates have been elected to serve in the legislatures of 10 different states: Fred Holyoke Brown '98 (U. of M.)—Vermont; Edmund Chauncey Bryant '79 (B. C. D. S.)—Maine; George V. Copp '84 (U. of M.)—Colorado; Zeno Lester Edwards '17 (U. of M.)—North Carolina; Adelard Joseph Fortier '94 (B. C. D. S.)—Rhode Island; Robert A. Franklin '00 (U. of M.)—Georgia; Timothy Oliver Heatwole '95 (U. of M.)—Maryland; Edgar Julian Hinson '06 (B. C. D. S.)—South Carolina; William Samuel Long '92 (B. C. D. S.)—North Carolina; Richard Covington Mackall '41 (B. C. D. S.)—Maryland; J. Wallace Massey '01 (U. of

M.)—Virginia; Michael Benedict Messore '30—Rhode Island; Jesse B. Powers '87 (B. C. D. S.)—Vermont; Reuben Bossart Weiser '68 (B. C. D. S.)—Colorado. Ezekiel J. Etheredge '96 (U. of M.) merits a special citation, for he served in the South Carolina General Assembly for 2 terms and the Florida Senate for 2 terms. He practiced in Leesville, S. C., for 17 years before going to Sebring, Fla., where he practiced from 1913 till his retirement in 1926.

What names have the most representatives in the File? Well, here are the top 20, totaling 560 alumni: Smith (76), Brown (52), Miller (41), Davis (37), Williams (31), Jones (29), Wilson (28), Martin (27), Johnson (24), Moore (24), Harris (22), King (22), White (21), Thompson (19), Lee (18), Lewis (18), Robinson (18), Taylor (18), Wright (18), Watson (17).

Did you ever hear of a dentist millionaire? When Judson Boardman Wood '69 (B. C. D. S.), of Richmond, Va., died, his estate was appraised at \$2,500,000. A veteran of the Civil War, Wood had made highly profitable investments in the Life Insurance Company of Virginia and the Chesapeake and Ohio Railroad. He willed one million to the First Baptist Church and one and a half million to the Medical College of Virginia. The organization meeting of the present Virginia State Dental Association was held in his office, and he served as its first treasurer (1870-74).

Six alumni practiced for 60 years or more. Thomas S. Eader '82 (B. C. D. S.), of Frederick, Md., heads the list with 70 years. William Joseph Warnock '89 (U. of M.), of El Paso, Texas, practiced for 68



years; William H. Savage '88 (B. C. D. S.), of Clifton Forge, Va., for 67 years; Llewellyn Caldwell Tucker '82 (B. C. D. S.), of Blackstone, Va., for 63 years; Frank Adolph Lee '81 (B. C. D. S.), of Lynchburg, Va., for 62 years; and James William Watson '92 (U. of M.), retired in 1952 after 60 years of practice in Harrisville, W. Va. and Santa Rosa, Calif.

The only alumnus to receive two degrees from the Baltimore schools is Vincente H. Roca, of Santiago, Cuba. After receiving his degree from Maryland in 1915, Roca returned to Cuba. Returning to Baltimore too late to take the Maryland State Board examination, he registered at the B. C. D. S. and was awarded the diploma of that school in 1917.

Where did they come from, those thousands of young Americans who entered the Baltimore dental schools with the dedicated purpose of achieving the dexterity and the knowledge that would enable them to qualify for the D. D. S. degree? They came from the big cities, the small cities, the towns, the hamlets and the crossroads. Up to 1900 they came chiefly from the country areas, for the country boy had the advantage over the city boy in many ways: he had more opportunities for developing manual skill; he had a greater appreciation of the values reflected by the dental degree; and he was more ambitious to improve his economic and social positions. These are some of the places our alumni have come from—places with names that suggest the spirit, the history, the character, and the shape of our country: Pipe Stem, Paw Paw, Lost Creek, Burnthouse, War, Canvas, Amigo, Indian Mills,

Red Sulphur Springs, Upper Tract (West Virginia); Moncks Corner, Prosperity, Holly Hill, Fort Lawn (South Carolina); Snow Hill, Flintstone, Westernport, Fairplay, Port Tobacco, Mechanicstown (Maryland); Earnest, Scotland Neck, Bachelor, Magnolia, Pinnacle, Kings Mountain, Little Switzerland, Warsaw, Hickory, East Bend (North Carolina); Ono, Buffalo Mills, Economy, Mason and Dixon, Gap, Dry Run, Shickshinny, Chicora, Library, Red Lion, Cherry Tree (Pennsylvania); Lake Hiawatha, Manasquan, South River, Short Hills (New Jersey); Haymarket, Wheatland, Timberville, Blacks and Whites, Farmville, Lone Oak, Lot, Round Hill (Virginia); Calais, Unity, Skowhegan, Prospect Harbor (Maine); Broken Bow (Nebraska); Equality, Ohatchee, Spring Hill (Alabama); Excelsior (Minnesota); Manifest, Cctonport (Louisiana); Moosup, Orange (Connecticut); Scotia, Ilion, Bombay, Peru, Black Stump, Mexico, Painted Post (New York); Moscow, North Hero, Essex Junction (Vermont); Homer (Illinois); Sparta (Wisconsin); Fitzgerald (Georgia); Waterville (Kansas); Cherry Valley (Massachusetts).

Alvin Richard Eaton '89 (B. C. D. S.) is distinguished because he received his diploma at the age of 49 and is the oldest graduating senior in the records of the Baltimore schools. Like many of his contemporaries, Eaton had studied and practiced dentistry for several years before seeking formal training. After graduation he practiced in Elizabeth, N. J., till his retirement in 1916. On March 18, 1911 Dr. Eaton was given a dinner by the state societies of New



Jersey and New York in celebration of his golden anniversary of practice.

Phineas Edgar Horton '94 (U. of M.), of Winston-Salem, established what may be not only an alumni but also a national record. Horton attended 47 consecutive meetings of the North Carolina Dental Society, of which he was president in 1911.

Among our alumni are two combinations of father-son presidents of state dental associations. B. Holly Smith '81 (B.C.D.S.) was president of the Maryland State Dental Association 1893-94; while his son, F. Noel Smith '23, was president in 1935-36. Philip F. M. Gilley '13 (U. of M.) served as president of the Maine Dental Society 1938-39; his son, Frank Palmer Gilley '45, served in 1959-50. The Gilleys are among fourteen of our graduates who have been elected to head the Maine Society.

There are a large number of sets of two brothers in the File and several sets of three brothers. But the Harrises of Harrisonburg, Va., constitute the only set of four brothers. James Howard graduated in 1861; George Thomas, in 1868; Frank Lewis in 1871; and Sandy Stuart in 1877—all from the B.C.D.S.

There are two combinations of three sons-and-father graduates. George Alsop Sprinkel graduated from the B.C.D.S. in 1868. The sons graduated from the University of Maryland: A. Hume '91, George A. Jr. '98 and Robert Wilmer '03. The Sprinkels practiced in Virginia, their native state. Elmer Ernest Richardson graduated from the B.C.D.S. in 1900. James Brantley graduated in 1925; Alexander Liles in 1934; and Richard Edgeworth in 1937. A native

of Virginia; the father began practice in Leaksville, N.C., where the sons were born and reared.

Newell Sill Jenkins '63 (B.C.D.S.), who spent most of his practice years in Dresden, Germany, and achieved fame for his work with porcelain, was primarily responsible for introducing Kolynos (from the Greek meaning "disease preventer"). Dr. Jenkins presented the formula of Kolynos at the 1908 meeting of the American Dental Society of Europe held in London. He had worked for eighteen years to develop an agent that would not only clean and polish the teeth but also destroy the mouth bacteria.

Eight alumni accomplished remarkable records of service as members of state boards. Henry Wood Campbell '89 (U. of M.) was a member of the Virginia Board for 35 years, from 1896 till his death in 1931. Thomas Lee McCarriar '08 (B.M.C.) served on the Maryland Board for 29 years. Henry A. Wilson '92 (U. of M.) was a member of the Maryland for 28 years, 1902-30. John F. Dowsley '84 (B.C.D.S.) was appointed to the first Massachusetts Board and continued as a member for 27 years. Almond Joel Cutting '84 (U. of M.), appointed to the Connecticut Board in 1915, served five five-year terms. Frederick C. Barlow '84 (B.C.D.S.) was a member of the New Jersey Board for 24 years. Frederick F. Drew '75 (M.D.C.) served on the Maryland Board for 22 years (1898-1922). John H. Wheeler '95 (B.C.D.S.) was a member of the North Carolina Board for 20 years (1908-28).

In a paper presented at the 1877 meeting of the American Dental As-



sociation, Frederick Henry Rehwinkel '55 introduced the term "pyorrhea alveolaris." Rehwinkel used it to designate those inflammations of the peridental membrane beginning at the gingival margin.

(The Journal's editor would welcome comments about this first effort to present to the alumni information based on the Alumni File. He would also be pleased to receive corrections, additions, and suggestions).

## FACULTY CHANGES FOR THE 1960-61 YEAR

Dean Myron S. Aisenberg reports these faculty changes: the **resignations** of Dr. Tobias Weinberg, Instructor in Pathology, and Dr. Herbert G. Levin, Instructor in Operative Dentistry; the **appointments** of Dr. Charles A. Darby, Instructor in Oral Diagnosis, Dr. Paul A. Deems, Instructor in Orthodontics, Dr. Joseph J. Giardina, Instructor in Pedodontics, Dr. John S. McLaughlin, Instructor in Oral Medicine, and Dr. Theodore J. Noffsinger, Jr., Instructor in Operative Dentistry.

## B. C. D. S. STUDENTS WIN NATIONAL WRITING HONORS

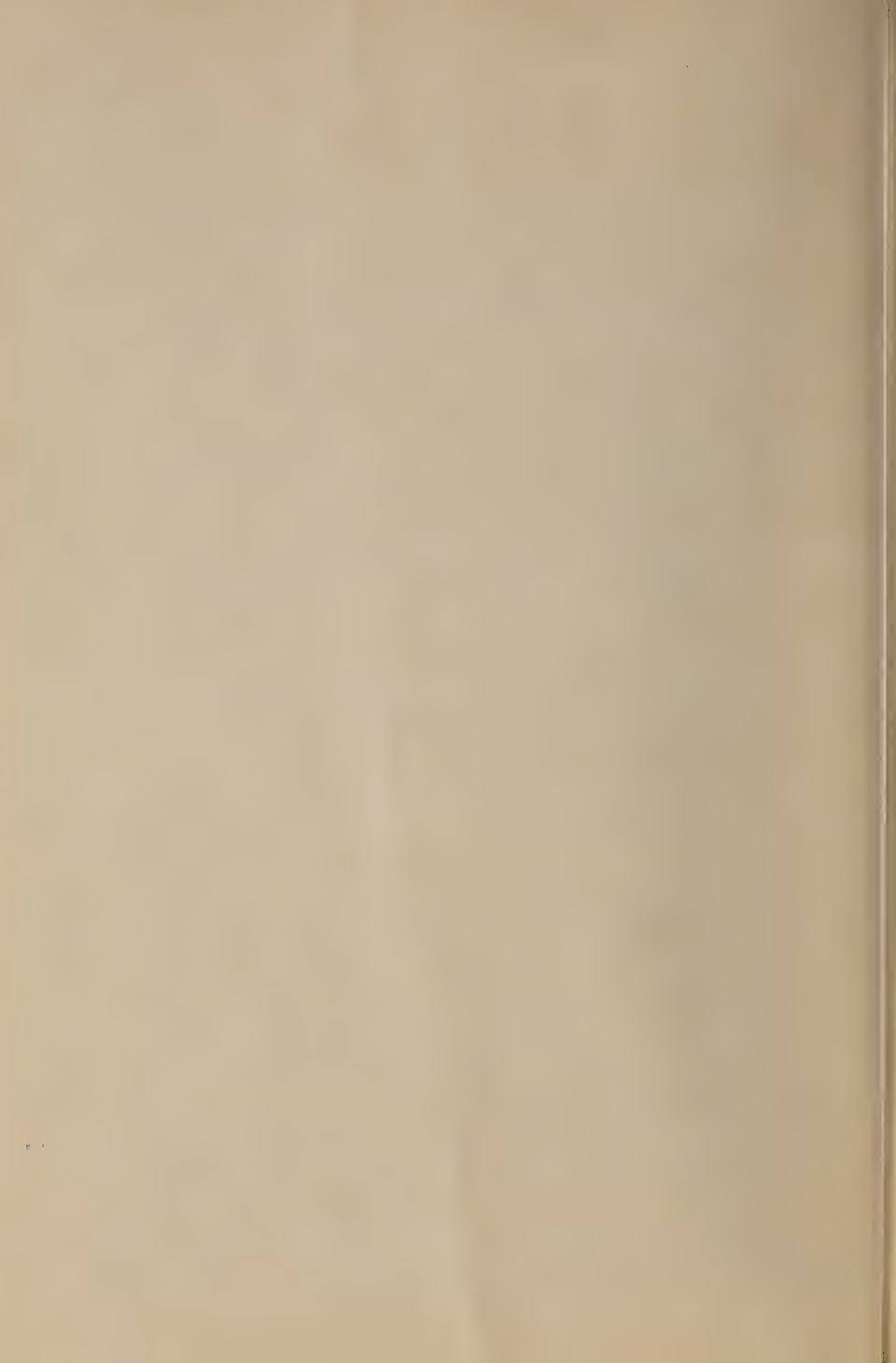
The first M. D. K. Bremner Award Contest sponsored by the American Academy of the History of Dentistry was won by Rolla R. Burk, Jr., a member of the Class of 1960. The Contest was open to seniors in all the dental schools of this country and Canada. Dr. Burk's paper on "Dentistry and Religion" was the unanimous choice of the judges for first place. He has been given a plaque and \$100. Now serving a USPHS internship, Dr. Burk has been invited to read his prize-winning paper at the USPHS meeting to be held at Lexington, Ky., in April.

Alan J. Martin, a member of the present senior class, won a tie for second place in the Fifth Annual Writing Award Competition sponsored by the American College of Dentists. The subject of the Contest was "The Need for Continuing Education in Dentistry." Mr. Martin's essay will be published in the **Journal of the Maryland State Dental Association**.











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DENTAL SCHOOL • UNIVERSITY OF MARYLAND



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## TENTATIVE COMMENCEMENT PROGRAM

### WEDNESDAY, JUNE SIXTH

- 12:30 p.m.—Golf Tournament  
6:00 p.m.—Caswell Room, Lord Baltimore Hotel  
OMICRON KAPPA UPSILON (PHI CHAPTER)  
Banquet and Convocation

### THURSDAY, JUNE SEVENTH

- 9:00 a.m.—Student Union Building  
Registration of Alumni  
10:00 a.m.—Meeting of the Officers, Council, and Trustees of the Alumni Association  
12:00 noon—Luncheon  
1:00 p.m.—Annual Business Meeting of the Alumni Association

### REUNION DINNERS FOR CLASSES OF 1932 - 1952 - 1957

### FRIDAY, JUNE EIGHTH

- 9:30 a.m.—Lord Baltimore Hotel  
Academic and Awards Program  
12:00 noon—Lord Baltimore Hotel  
Luncheon  
7:30 p.m.-1:00 a.m.—Lord Baltimore Hotel  
Cocktails, Dinner and Dancing

### SATURDAY, JUNE NINTH

Morning Graduation Exercises—College Park, Maryland

### ALUMNI PROGENY IN FRESHMAN CLASS

There are two sons and a daughter of alumni in the present Freshman Class (1965): Carolyn Elizabeth Barclay, daughter of Robert Stark Barclay '33, of York, Pa.; Anthony Eugene Curcio, son of Emil Louis Curcio '35, of Brooklyn, N. Y.; and William Andrew Imbach, son of William Andrew Imbach, Jr. '34, of Baltimore.

Three members of the Class of 1965 are sons of graduates of other dental schools: Philip Saul Ferris, of

Wheaton, Md., son of George Joseph Ferris, a 1938 graduate of the Dalhousie University Faculty of Dentistry; James Edgar MacBride, Jr., of York, Pa., son of James Edgar MacBride, a 1931 graduate of the University of Pittsburgh School of Dentistry; and Robert Austin Mullen, of Brooklyn, N. Y., son of George Edward Mullen, a 1939 graduate of the Columbia University School of Dental and Oral Surgery of the Faculty of Medicine.



## RESEARCH GRANTS AT THE SCHOOL

The Department of Pedodontics is conducting a Dental Assistant Training Program under a grant of \$13,800 from the USPHS which was initiated in the fall of 1961.

The Department of Microbiology has been given two grants of \$7,000 each by the USPHS for a "Continuation Study of the Investigation of Staphylococcus Aureus" and research on "The Relationship of the D.M.F. Index to the Secretor Non-Secretor Status in Man."

The Department of Oral Surgery has received a grant of \$2,500 from the National Institute of Dental Research for the continuation of its research project on the "Hard and Soft Tissue Tolerance of Ostamer."

The Department of Physiology has received two grants: \$13,000 from the Department of the Army—"Effect of Ryanodine on Skeletal Muscle;" \$3,942 from the USPHS—"Properties of Delta Protein."

Research is being conducted by the Department of Anatomy on "The Effect of Diurnal Fluctuation of Temperature upon Sea Lamprey Development," supported in part by a grant from the Bureau of Commercial Fisheries, U. S. Fish and Wildlife Service. A research project on the "Hybridiza-

tion of Lampreys Indigenous to the Great Lakes and the Sea Lamprey" was supported by the Bureau of Commercial Fisheries. Research on the "Creation of Anatomical Visual Aids from Paints and Plastics" was expanded to include neuroanatomical materials under support in part of Tri-Chem, Inc., West Orange, N. J.

The Department of Histology and Embryology received \$33,955 from the N.I.H. for the purposes of training students in research and of executing work on these research projects: "The Effect of Gold Foil Condensation on the Pulp Tissue," "Microcirculation of the Oral Tissues," and "Carbohydrate Metabolism in Oral Streptococci."

The Department of Pathology has been awarded several grants for the support of various continuing research projects: from the USPHS—"Morphologic, Histochemical and Histogenic Studies on Experimental Lathyrism;" from the N. I. H.—"A Pilot Study on the Distribution of Mast Cells in Dilantin Gingival Hyperplasia" and "Hydrolytic Enzymes (Esterases) Activity in Oral Tissues;" from the U. S. Army—"Beta-amino-propionitrile-anorganic Bone in the Repair of Maxillofacial Wounds."



## NOTES ON THE TRIAL OF PROFESSOR WEBSTER FOR THE MURDER OF DR. PARKMAN

LESTER NOBLE, D.D.S. (Class of 1850)

(On November 23, 1849, Professor John W. Webster, Professor of Chemistry and Mineralogy at the Harvard Medical College, murdered Dr. George Parkman, a wealthy and prominent Boston physician, for whom the chair of Anatomy and Physiology at Harvard had been named. The Parkman-Webster case, one of the classic murders in the annals of American crime, has been repeatedly anthologized by writers who are specialists in the art of dramatizing murder.

Webster was taken into custody on November 30 and charged with the murder of Dr. Parkman, who had been his benefactor. On March 17, 1850, Webster was put on trial by the Supreme Court of Massachusetts. The fact that the evidence presented by Dr. Nathan Keep and his former assistant, Lester Noble, led to the conviction of Webster has established the case as an outstanding chapter in the history of forensic dentistry.

Dr. Noble gave his account of the trial at the Union Meeting of the Connecticut Valley and Connecticut State Dental Societies, held in Hartford in May, 1893. Dr. Noble's presentation of many interesting details of the prosthetic procedures employed by Dr. Keep constitutes a particularly good exposition of an important area of the dental practice of the period.)

At the time the murder was committed I was a student in the Baltimore College of Dental Surgery, and was summoned as a witness for the prosecution. The crime was committed on Friday, in the Medical College, Boston, after the students had

left. On the following Friday, Professor Webster was arrested. In the meantime he had endeavored to dispose of the body; he had cut it up, burned the head and large portions of the body in the laboratory furnace, hiding other parts in various places. The destruction was so effectual that the most important evidence for conviction was the identification of the artificial teeth. The question had been raised whether Dr. Keep and myself could surely identify those teeth, after they had been subjected to such a heat, as those which we had made for Dr. Parkman, and which had been worn by him. This evidence was of vital importance, for if we could not prove that the jaw and teeth were Dr. Parkman's the prosecution could not prove his death. Further, if they failed to prove the death of Dr. Parkman it was impossible to demonstrate that Dr. Webster or any one else had killed him, hence the importance of Dr. Keep's and my testimony.

At this time there was a supply of manufactured teeth on the market, yet they were all single teeth, and it was considered altogether more desirable for a dentist to manufacture the artificial teeth used in his practice if he were competent to do so.

There were found among the charred human remains in the furnace an upper and a lower set of block teeth; the gold plates were melted to nuggets, the lower teeth somewhat injured, but the full upper set in three blocks was perfect, except for being slightly bent. I will now state



Dr. Keep's mode of manufacturing artificial teeth, to show how it was possible to identify them. After the plates had been fitted, and a set of teeth carved out of wax, the exact size and style required, molds were made. Everything in plaster connected with the case was carefully kept and labeled in a box by itself, and this numbered and entered in the catalog.

When the teeth were molded they were baked slightly, just enough to give them strength, and yet be easily cut with a little twist drill held by the thumb and finger. We made four or six holes in a front block of six teeth and three or four in a side block of four teeth, and they must be absolutely parallel in both directions. The enamel was then placed on, and the gum color, inside as well as outside. This was a specialty of Dr. Keep's. The teeth were again baked till properly vitrified. This accomplished, a wood cylinder was fitted to each hole, and the gold wire to be used for pins soldered on the gold plate, which fitted accurately this cylinder. With moderate pressure, the central block of six teeth would go to its exact position on the plate; the side blocks were put in place in the same manner. It may appear a difficult task to place these pins on the plate with such exactness that the block would go down without binding, but it could always be accomplished. When the set was wet or even moistened the teeth were perfectly tight; after a thorough drying they could at any time be removed.

Dr. Keep made a set of teeth for Dr. Parkman soon after I entered his office as a student. This was about a year before the advent of central air-chambers, and each plate was held in

place by spiral springs attached to the artificial gum above the bicuspid by a hole drilled through the block.

With Dr. Parkman's teeth I had more than a first acquaintance. He was a very nervous man, and occasionally would take out his plates and put them in his coat-tail pocket and soon he would forget them, and when he sat down the teeth would suffer considerably, necessitating repairs. I must have repaired those plates at least half a dozen times. The lower jaw had on the left side, the cuspid, the lateral incisor, and the root of the first bicuspid; on the right side, the cuspid and the roots of the first and second bicuspid. The gold plate went over these roots on both the right and left side and around the three teeth which were entire. All the teeth from the cuspid back on the left side were in one block, and those from the first bicuspid on the right side were also in one block. There was also the small block of three incisors. Any dentist will see that it was an extraordinary shaped plate, requiring a very unusual block to fit it. Dr. Parkman insisted on having the plate made over these roots; when Dr. Keep objected, Dr. Parkman said, "I pay the bills; I want you to try it, and do the best you can." The lower teeth were ground on the inside to make room for his tongue, thus grinding off a portion of the gum color. I was present when Dr. Keep ground them, with an old copper cent for a wheel, and the addition of water and emery. The teeth found in the furnace fitted exactly into our molds, and they plainly showed the marks of the grinding, and the holes where the spiral springs had been inserted. Further, there was no mistaking the



peculiar shade of gum color and of the enamel of the teeth made from Dr. Keep's secret recipes. There was in the Dr. George Parkman box of models, duly marked and dated, a model made from a wax impression of the lower jaw, showing the number and position of the teeth and roots which were there when the teeth were made. The charred and broken lower jaw had them in the same number and the same position as the plaster model, made three years before. If there had been found just one tooth or root of a different class from those the model showed Dr. Parkman to have had, it would have been a powerful argument for the defense, but, as it was, the identification was complete. Professor Webster was con-

victed, and hung in the following August. Before his death he made a confession of the murder.

(Dr. Lester Noble was born in 1819 and died at Longmeadow, Mass., in 1905. Previous to his entering the Baltimore College of Dental Surgery he had for several years served as an assistant in the office of Dr. Keep, one of the great American contributors to the art and science of dentistry. After his graduation Dr. Noble was for a time associated with Dr. Edward Maynard of Washington, D. C., another of the leading figures in the progress of American dentistry. He served on the faculty of his alma mater as Demonstrator of Mechanical Dentistry. He spent most of his professional years in Springfield, Mass.)

## FACULTY CHANGES FOR THE 1961-62 YEAR

Dean Myron S. Aisenberg reports these faculty changes: the **resignations** of Dr. Victor S. Primrose, Instructor in Full Denture Prosthesis; Dr. John M. Foley, Instructor in Histology and Embryology; Dr. Theodore J. Noffsinger, Jr., Instructor in Operative Dentistry; Dr. Robert L. Heldrich, Instructor in Oral Diagnosis; Dr. John S. McLaughlin, Instructor in Oral Medicine; Drs. Richard M. Hemphill, Peter L. Johnson, and Christopher J. O'Connell, Jr., Instruc-

tors in Oral Surgery—the **appointments** of Dr. John G. Goettee, Jr., Instructor in Fixed Partial Prosthesis; Drs. James R. Crouse and David W. Heese, Instructors in Operative Dentistry; Dr. James E. Palmer, Instructor in Oral Diagnosis, Dr. Michael E. Kolakowski, Jr., Instructor in Oral Medicine, Drs. Gene E. Camp and Chester Richmond, Instructors in Oral Surgery; and Dr. Jerome D. Buxbaum, Instructor in Physiology.



## FACULTY ACTIVITIES

(This is a report on the varied activities of the faculty members during 1961).

Dr. Myron S. Aisenberg, Dean, appeared on several programs: January 17-18, "Diagnosis of Oral Cancer" and "Symposium on Occlusion," Rhode Island State Dental Society, Providence; February 15, "Oral Soft Tissue Lesions," V. A. Hospital, Brockton, Mass.; June 22, "Oral Lesions Other Than Cancer of the Mouth," V.A. Hospital, Lebanon, Pa.; November 1, "Diagnosis of Cancer in and about the Oral Cavity," Pennsylvania Section of the American Cancer Society, New Castle; December 6, "Cysts of the Jaws," Children's Hospital, Baltimore. On October 21 the Order of the Sword of Hope was conferred upon Dr. Aisenberg by the Pennsylvania Section of the American Cancer Society at New Castle in recognition of the assistance he has given to dentists in the differential diagnosis of malignancies originating in the mouth.

Dr. William E. Hahn, Professor of Anatomy, was reappointed consultant to the Council on Dental Education. As a member of the Council's Committee on Aptitude Testing, he participated in a conference held in Chicago in September concerning a high school aptitude program and student recruitment. In August he went to Chicago to assist in the test construction program of the National Board of Dental Examiners. Dr. Hahn served as chairman of the Committee on Teaching of the American Association of Dental Schools. The Committee conducted a survey in September to determine the nature and extent of teacher education programs being offered by the member institutions.

Dr. J. Philip Norris, Assistant Professor of Oral Medicine, presented two papers: in February, "A Frank Appraisal of the Present Status of the Bacterial Culture Test as a Routine Endodontic Procedure," American Association of Endodontists, Chicago; in May, "Endodontic Management of the Acute Alveolar Abscess," Maryland State Dental Association, Baltimore. Dr. Norris is Secretary-Treasurer of the Maryland chapter of Omicron Kappa Upsilon.

Dr. Edward C. Dobbs, Professor of Pharmacology and Therapeutics, presented several papers: January 17, "Prevention and Treatment of Dental Office Emergencies," Rhode Island State Dental Association, Providence; February 5, "Carbocaine, the New Local Anesthetic," American Dental Society of Anesthesiology, Chicago; May 9, "Pain Control in Dentistry," School of Pharmacy, University of Maryland; October 18, "Treatment of Dental Office Emergencies," American Dental Hygienists' Association, Philadelphia; November 3, "Drugs Used in Pedodontics," Postgraduate Seminar, Dental School, University of North Carolina, Chapel Hill. Dr. Dobbs published two papers: "Problems of Contamination and the Advantages of the Disposable Needle," *Journal of the American Dental Society of Anesthesiology* (April); and, in collaboration with Dr. Ross, "The New Local Anesthetic—Carbocaine," *New York State Dental Journal* (November). The twelfth edition of Dr. Dobbs' textbook *Pharmacology and Oral Therapeutics* was published by the C. V. Mosby Company. Dr. Dobbs contributed the section on "Pharmacology and Therapeutics" to the third edition of *Review of Dentistry*, also published by Mosby.



Dr. Norton M. Ross, Assistant Professor of Pharmacology, in collaboration with Dr. Dobbs, wrote "The New Local Anesthetic—Carbocaine," published in the November issue of the **New York State Dental Journal**. Dr. Ross was elected Secretary-Treasurer of the Maryland-District of Columbia Section, American Academy of Dental Medicine; and Master of the Maryland Graduate Chapter of Sigma Epsilon Delta fraternity.

Dr. Hugh M. Clement, Jr., Assistant Professor of Operative Dentistry, and Dr. Sterrett P. Beaven, Instructor in Operative Dentistry, presented a table clinic on "Fundamentals of Amalgam Manipulation," Baltimore City Dental Society, March 9.

Dr. Francis A. Veltre, Instructor in Operative Dentistry, presented 2 table clinics: January 31, "Atypical Amalgam Preparations," Baltimore County Dental Association; March 9, "Management of Atypical Amalgam Restorations," Baltimore City Dental Society.

Dr. José H. Diaz, Assistant Professor of Operative Dentistry, presented a table clinic on "Mercaptan Rubber Impressions," Baltimore City Dental Society, March 9; and addressed the Dental Assistants Association (Baltimore), October 12, on "Physical Properties and Manipulation of Dental Cements."

Dr. Yam-hin Louie, Associate Professor of Operative Dentistry, presented a table clinic on "Physiologic Tooth Form and Its Relation to the Periodontium," Baltimore City Dental Society, March 9.

Dr. Douglas J. Sanders, Associate Professor of Pedodontics, was a participant in the workshop on "The Handicapped Child" held at the Uni-

versity of Pennsylvania School of Dentistry, January 9-11. He was the Director of the refresher course in Pedodontics given at the School, May 20 and 21 and is the Director of the Dental Assistants Program introduced in association with the School in October. As the Chairman of the Council on Dental Health of the Maryland State Dental Association he attended the meeting of the Council on Dental Health of the A.D.A. held in Chicago in April. Dr. Sanders achieved initiatory listings in both **Who's Who in American Education** and **American Men of Science**.

Dr. José E. Medina, Professor of Operative Dentistry, presented these papers: February 10 and September 7, "Amalgam Restorations," Walter Reed Army Medical Center, Washington; October 14, "A Philosophy of Dental Practice," American Academy of Gold Foil Operators, Philadelphia; October 27, "The Practice of Operative Dentistry," Naval Dental School, Bethesda. He served as the moderator of 2 panel discussions: March 9, "Restorative Dentistry," Baltimore City Dental Society; October 16, "The Elimination of Postoperative Pain in Operative Dentistry," American Dental Association, Philadelphia. Dr. Medina participated as essayist, clinician and supervisor in two programs of the New England Study Club of Dentistry on "Class V Restorations:" May 5-6 in Boston and October 9-12 in Providence, R. I. He was the Director of the postgraduate course on "Recent Developments in Restorative Dentistry" given at the School on November 18. Dr. Medina is the editor of the **Journal of the American Academy of Gold Foil Operators**. (Omitted from the May, 1960 issue



was the notice of Dr. Medina's becoming a Fellow of the American College of Dentists).

Dr. Edmond G. Vanden Bosche, Assistant Professor of Tooth Morphology, gave a table clinic on "Physiology of Tooth Form" and was a panelist in the discussion of "Restorative Dentistry," Baltimore City Dental Society, March 9.

Dr. Calvin J. Gaver, Associate Professor of Operative Dentistry, presented 3 papers: January 31, "Pin Retention for Amalgam," Massachusetts State Dental Association, Boston; February 14, "Tips for Good Amalgams, Inlays and Silicates," Eastern Shore Dental Society, Easton, Md.; April 19, "Amalgam Restorations," Beckley (W. Va.) Dental Society. On March 13, Dr. Gaver served as a panelist on the subject of "Amalgam Failures," at the District of Columbia Dental Society's Postgraduate Clinic. He spoke on "Applications of Amalgam" before the Dental Assistants Association on October 5. He presented on October 14 a chair clinic demonstrating "Class V Gold Foil," American Academy of Gold Foil Operators, Philadelphia. In collaboration with Dr. Bianco he gave table clinics on "Pin Retention for Amalgam" at the Chicago Midwinter Meeting, February 8; and on "Class V Mat Gold Restorations," Baltimore City Dental Society, March 9. Dr. Gaver again collaborated with Dr. Bianco in presenting a postgraduate course in "Newer Developments of Restorative Materials" to the members of the Baltimore City Dental Society, October-November. He was elected to membership in the International College of Dentists and the American Academy of Gold Foil Operators.

Dr. Henry J. Bianco, Instructor in Operative Dentistry, gave a chair clinic on "Class V Gold Foil," American Academy of Gold Foil Operators, Philadelphia, on October 14. His 3 collaborations with Dr. C. J. Gaver are noted in the preceding paragraph. On January 31 he collaborated with Dr. Veltre in presenting a table clinic on "Atypical Amalgam Preparations," Baltimore County Dental Association. Dr. Bianco was elected to membership in the American Academy of Gold Foil Operators.

Dr. John I. White, Professor of Physiology, presented a paper on "Action of Ryanodine on Skeletal Muscle" as a participant in a symposium on "Properties of Ryanodine" held at the Army Chemical Center (Edgewood, Md.) on October 3. Dr. White contributed "Occurrence of an Inhibition of ATP-Creative-Transphosphorylase in the Plant, *Ryania Speciosa*, Vahl to Biochemical and Biophysical Research Communications.

Dr. Joseph P. Cappuccio, Associate Professor of Oral Surgery, presented several papers: January 17-18, "Problems of Oral Surgery in Dental Practice," Rhode Island State Dental Society, Providence; January 21-25, "Problems of Surgery in General Practice" and "Management of Temporomandibular Joint Dysfunctions," Dental Association of Puerto Rico, San Juan; March 14, "Hints on Exodontia," District of Columbia Postgraduate Clinic, Washington; March 20-22, "Problems of Oral Surgery in Dental Practice," Greater Philadelphia Meeting; May 14-17, "Preparation of the Oral Cavity for Dentures," New Jersey State Dental Association, Atlantic City; October 21-25, "Preparation of the Oral Cavity



for Dentures" and "Sterile Technique in Oral Surgery," Dental Association of Puerto Rico, San Juan. Dr. Cappuccio was elected to several offices: President of the Alumni Association of the B.C.D.S.; Deputy Councilor of Alpha Chapter of Psi Omega for another 3-year term; Editor of the Maryland Section of the International College of Dentists; member of the Board of Directors of the First Fidelity Savings and Loan Association for a 3-year term; Delegate from Maryland to the American Dental Association, 1961-63. He was appointed Chairman of Region 4 (Middle Atlantic) of the American Dental Society of Anesthesiology. On May 6 Dr. Cappuccio was selected by Alpha chapter as Psi Omega of the Year.

Dr. Kyrle W. Preis, Professor of Orthodontics, served as Chairman of the Maryland Section of the American College of Dentists and as Deputy Regent of the International College of Dentists. On January 11 he spoke to the Mothers' Club of the Cathedral School on "Childhood Dental Problems" and on October 10, to the Gorgas Odontological Society on "Dental Journalism." Dr. Preis made 3 presentations to professional groups: October 17, "Childhood Habits" (with motion picture and slides), Graduate School of Orthodontics, University of Pennsylvania Dental School; October 19-25, "Childhood Habits" (motion pictures, slides, and table clinics), Dental Society of Puerto Rico; October 31, "Childhood Habit Problems with Reference to Psychological Factors Involved," Medical and Dental Staffs of USPHS Hospital, Baltimore. He is the editor of *Alma Mater*.

Dr. George W. Piavis, Associate

Professor of Anatomy, presented a demonstration on "Neuroanatomical Visual Aids Produced with Paint and Plastic" at the meeting of the American Association of Anatomists at Minneapolis. An abstract was published in the February issue of *The Anatomical Record*.

Dr. Ernest B. Nuttall, Professor of Fixed Partial Prosthesis, appeared on the programs of these meetings: January 12-18, Rhode Island State Dental Society; January 31, Kentucky Dental Association; May 17, Odontological Society of Western Pennsylvania; August 14, Division of Dentistry, Walter Reed Army Institute of Research; October 2, Greater St. Louis Dental Society; October 16-19, Partial Prosthodontics Section, A.D.A. In November he gave a series of lectures to the Dental Assistants Association (Baltimore). Dr. Nuttall published 2 papers: "Factors Influencing Success of Porcelain Jacket Restorations," *Journal of Prosthetic Dentistry* (July-August) and "Diagnosis in Relation to Partial Prosthodontics," *Journal of the Maryland State Dental Association* (September). He attended these meetings: February, American Academy of Restorative Dentistry, American Academy of Crown and Bridge Prosthodontics (President-elect), and the Chicago Dental Society; March, American Association of Dental Schools (faculty representative); December, New York Academy of Prosthodontics, Columbia University. Dr. Nuttall attended the Conference on Dental Curriculum held at the College of Dentistry, University of Kentucky, December 6-9. He is a member of the State Commission on the Aging and of the Maryland Joint



Council to Improve the Health Care of the Aged.

Dr. Charles E. Loveman, Instructor in Anatomy, attended the Basic Institute on Hospital Service held in Boston in June and the Advanced Institute on Hospital Dental Service in Chicago in November. He also attended a seminar in Graduate Training in Oral Surgery in Chicago in November. Dr. Loveman was appointed the Maryland representative on insurance plan by the American Society of Oral Surgeons, trustee of the Midas Plan of the Maryland State Dental Association, and Program Chairman of the Middle Atlantic Society of Oral Surgeons.

Gardner P. H. Foley, Professor of Dental Literature and Dental History, is President-elect of the American Academy of the History of Dentistry and Chairman of the Program Committee and of the M. D. K. Bremner Award Contest sponsored by the Academy. He presented a paper on "Byways of Dental History" at the Academy's annual meeting in Philadelphia. At the meeting of the American Association of Dental Schools, held in Boston in March, Mr. Foley was appointed assistant editor of the **Journal of Dental Education**. In the December issue he began his contribution titled "Quarterly Post." He is the editor of the **Journal of the B. C.D.S.**, to which he contributed "From the Ranks of the File," a column, and is the associate editor of

the **Journal of the American Academy of Gold Foil Operators**. Mr. Foley contributed the initiatory section on "History of Dentistry" to the third edition of **Review of Dentistry**, published by the C. V. Mosby Company.

Dr. Harold Golton, Associate Professor of Oral Diagnosis, achieved initiatory listing in **Who's Who in the East**.

Dr. Conrad L. Inman, Assistant Professor of Anesthesiology, presented a paper on "Oral Lesions" before the Baltimore County Medical Society. Dr. Inman is President of the Middle Atlantic Society of Oral Surgeons.

Dr. Alvin F. Gardner, Associate Professor of Pathology, attended the Symposium on Genetics in Dentistry at the National Institutes of Health, sponsored by the American Dental Association and the National Institute of Dental Research. His monograph, **An Analysis of Lathyric Effects on Connective Tissues with a Review of the Literature from 500 B. C. to 1961**, was published by the New York Academy of Sciences. He was elected to membership of the Society of Experimental Pathologists of the Federation of Biological Sciences. Dr. Gardner is listed in **Who's Who in American Education**. He is the Science Editor of the **Journal of the Connecticut State Dental Association**.



## RETIREMENT OF GUY P. THOMPSON

After an association of 32 years with the University of Maryland, Guy P. Thompson, Associate Professor of Anatomy and Comparative Anatomy, retired in June, 1961.

Born in Berkeley Springs, W. Va., on August 27, 1895, Mr. Thompson received the A.B. degree (1923) and the A.M. degree (1929) from West Virginia University. He began his teaching career as an Instructor in Biology at Florida State College. In 1925 he came to the Baltimore Division of the University of Maryland as an Instructor in Zoology. After 19 years of teaching zoology to pharmacy and premedical students, Mr. Thompson became a member of the faculty of the School of Dentistry, with the title of Assistant Professor of Anatomy. In 1947 he was advanced to the rank of Associate Professor.

Mr. Thompson held membership in many organizations: Phi Beta Kappa, Beta Theta Pi, Sigma Xi, Maryland Biological Society, Phi Delta Chi

(Honorary), American Association for the Advancement of Science, and the Ancient Order of the Red, Red Rose. He contributed papers to *Science* and the *American Journal of Physiology*. The C. V. Mosby Company published his *Zoology Laboratory Studies*.

In May the Faculty Assembly honored Mr. Thompson at its annual dinner held at the Green Spring Inn. In June the student body presented gifts to their retiring professor and the 1961 edition of the *Mirror* was dedicated to him in recognition of "his gentle and courteous manner, his informal but effective way of conveying his vast resources of knowledge, and his devotion to teaching."

The best wishes of the faculty and the undergraduates will be supplemented by the warm regards of hundreds of alumni. Mr. and Mrs. Thompson are now living in Shallotte, N. C.

## STUDENT OFFICERS FOR 1961-62 YEAR

Senior Class: President, Robert R. Parker, Cumberland, Md.; Vice-President, John C. Wilhelm, Glen Burnie, Md.; Secretary, Richard F. Downes, Jr., Lanham, Md.; Treasurer, Leo Rabago, Jr., Fresno, Calif.; Historian, Laddie L. Jones, Simpsonville, S. C.; Sergeant at Arms, Jack A. Roth, Oakland, Md.; Student Senate Representatives, Lawrence F. Halpert, Baltimore, and John Thompson, Kearny, N. J.

Junior Class: President, Paul M. Ladd, Miami, Fla.; Vice-President, Kenneth H. Webster, Kennewick, Washington; Secretary, Della Ruth

Hartman, Scottsville, Va.; Treasurer, Fred M. Scholnick, Baltimore; Student Senate Representatives, James M. Carew, Hillsboro, N. H., and John C. Pentzer, Silver Spring, Md.

Sophomore Class: President, John F. Patterson, Baltimore; Vice-President, Wayne L. O'Roark, Chevy Chase, Md.; Secretary, John P. Hackett, Woodstown, N. J.; Treasurer, David L. Mincey, Charlotte, N. C.; Student Senate Representatives, Thomas K. Guglielmo, Passaic, N. J., and Malcolm L. McInnis, North Dighton, Mass.



Freshman Class: President, Wayne W. Wibby, Bangor, Me.; Vice-President, Robert A. Mullen, Brooklyn, N. Y.; Secretary, Carolyn E. Barclay, Towson, Md.; Treasurer, T. Lewis Klechak, Silver Spring, Md.; Student Senate Representatives, Murray G. Greenberg, Baltimore, and Lawrence F. Yampolsky, Hillside, N. J.

Alpha Omega: President, David Rubin, Miami, Fla.; Vice-President, Allan B. Pertnoy, Baltimore; Secretary, Martin N. Narun, Baltimore; Treasurer, Sidney S. Markowitz, Silver Spring, Md.; Chaplain, Jerome J. Newman, Miami Beach, Fla.; Historian, Jerome J. Weinstein, Baltimore.

Psi Omega: Grand Master, George G. Clendenin, Bethesda, Md.; Junior Master, James Probst, Baltimore; Secretary, Paul Shaffer, Westernport, Md.; Treasurer, Richard Koritzer, Baltimore; Chaplain, Thomas Toman, Silver Spring, Md.; Historian-Editor, William Finagin, Washington, D. C.; House Manager, Richard Gallagher, Silver Spring, Md.

Sigma Epsilon Delta: President, Barry S. Buchman, Baltimore; Vice-President, Leroy Goren, Baltimore;

Secretary, Mark L. Govrin, Newark, N. J.; Treasurer, Stuart T. Landsman, Bronx, N. Y.

Xi Psi Phi: President, Lawrence A. Gallerani, Agawam, Mass.; Vice-President, Dennis M. Sullivan, Augusta, S. C.; Secretary, Harvey R. Wildman, Danbury, Conn.; Treasurer, Paul F. Regan, Newton, Mass.

Gorgas Odontological Society: President, George J. Goodreau, Rye Beach, N. H.; Vice-President, David B. Kirby, Jr., Harrisburg, Pa.; Secretary, Joseph A. Salvo, Boston, Mass.; Treasurer, Daniel Levy, Augusta, Ga.; Sergeant at Arms, Charles A. Gallagher, Portsmouth, R. I.; Historian, Laurence E. Johns, Hagerstown, Md.

Interfraternity Council: President, David Rubin, Miami, Fla.; Vice-President, George C. Clendenin, Bethesda, Md.; Secretary, Barry S. Buchman, Baltimore; Treasurer, Lawrence A. Gallerani, Agawam, Mass.

Student Senate: President, James E. Andrews, Newton, N. C.; Vice-President, Dean C. Johnson, Salt Lake City, Utah; Secretary-Treasurer, Donald R. Yent, Baltimore.

## THE POSTGRADUATE PROGRAM FOR 1961-1962

The program was initiated with the presentation of a course entitled "Recent Developments in Restorative Dentistry," presented on Saturday, November 18, 1961, in the Student Union Building. It was attended by twenty practicing dentists and faculty members, and eighteen senior dental students. The course was presented by two clinicians—Dr. José E.

Medina, Professor and Head, Department of Operative Dentistry at the B. C. D. S., and Mr. Ralph W. Phillips, Professor and Chairman, Department of Dental Materials at Indiana University, School of Dentistry. This refresher course was arranged by the Department of Operative Dentistry in cooperation with the Postgraduate Division, and



was designed to provide the general practitioner with up-to-date information on the recent developments of restorative materials. Amalgam, cast gold, cements and resins were considered from the point of view not only of their physical properties but also of their clinical significance. Those factors which affect accuracy and permanency were emphasized, particularly since they contribute to clinical success. The registration fee for the course was \$25.00.

On April 5, 1962, the Postgraduate Division of the B. C. D. S. sponsored a course on "Dental Radiological Health," conducted by the Division of Radiological Health, Public Health Service, U. S. Department of Health, Education and Welfare. Three visiting lectures participated, presenting material in areas related to radiological health: Dr. Simon Kinsman, "Production and

Properties of X-rays"; Dr. Gary S. Shaber, "The Biological Effects of Radiation"; Dr. George L. Crocker, "Reduction of Radiation Exposure." Motion pictures and demonstrations supplemented the excellent program. The course was intended to provide dentists with additional training in the basic principles of reducing ionizing radiation exposure to patients and operators in normal dental radiographic procedures. It was attended by 45 registrants. There was no registration fee.

Announcements of the courses are sent to all alumni in the adjoining states. Graduates of other dental schools are contacted by mail through the secretary of their state association.

All communications relative to the postgraduate program should be directed to Dr. Donald E. Shay, Director, Postgraduate Division.

## A CLINIC REPORT OF 1876

This report of work done in the Operative Department of the Baltimore College of Dental Surgery for the session of 1875-6 is interesting for many reasons. It presents a table of clinic operations that provides an excellent source of information for comparing student efforts with those recorded in other years. There are also presented types of operations and types of materials that make the report valuable historically.

The report was made to Dr. Ferdinand J. S. Gorgas, Dean, by Dr. Judson B. Wood '69, Demonstrator of Operative Dentistry.

|                       |      |
|-----------------------|------|
| Teeth Extracted ..... | 1500 |
| Gold fillings .....   | 246  |
| Tin fillings .....    | 250  |

|                           |    |
|---------------------------|----|
| Os: Art. fillings .....   | 36 |
| Hills stop fillings ..... | 25 |
| Amal. fillings .....      | 15 |
| Root fillings .....       | 25 |
| Nerves Cap'd .....        | 20 |
| Gas administered .....    | 40 |
| Chlo. administered .....  | 5  |

Total number of operations ..... 2162  
Money received \$111.40

Two of the materials cited invite explanation. "Os: Art." (Os-Artificial) was introduced about 1859 as "a substitute for all coarse materials in filling teeth" and was described as "useful for re-setting pivot teeth in badly decayed roots; also for filling over sensitive dentine and exposed pulps, as a non-conductor of heat, and



for many other dental purposes." The manufacturer claimed that this product was "the only article of oxychloride of zinc that will not dis-appoint the most sanguine expectations" of the profession.

Prompted by the demand for a suitable filling, which gained momentum as a result of the "amalgam war," Dr. Asa Hill (1815-1874) began a series of experiments with various mixtures and compounds. In 1849 he

patented "Hill's Stopping," a mixture of bleached gutta-percha, carbonate of lime, and quartz. It proved not to be hard enough for a permanent filling but was so acceptable as a temporary filling that it was used for over half a century throughout the civilized world for that purpose. It was also used for all classes of cavities in deciduous teeth.

G. P. H. F.

### FROM THE RANKS OF THE FILE

At the commencement exercises of the Baltimore College of Dental Surgery held at the Concordia Opera House, February 25, 1875, these subjects of senior theses were announced: Mechanical Dentistry, Diseases of the Teeth, Artificial Teeth, The Teeth, Artificial Dentures, Anaesthetics, Dental Caries, and Filling Teeth.

Eighty-six years later, a comparable number of members of the Class of 1961 wrote theses on these subjects: Cancer of the Lip, Gingival Manifestations of Sodium Diphenyl Hydantoinate, The DF of Non-institutionalized Mongoloid Children, The Gene and Heredity: Their Active Function in the Etiology of Malocclusion, A Clinical Evaluation of the Use of High-speed Instruments in Pedodontics, Carbocaine as a Topical Anesthetic, The Effect of Electrogalvanic Currents on Migration of Lactobacillus, and An Interpretation of the Dental Aspects of George Bernard Shaw's Play, "You Never Can Tell."

The emphatic contrasts of these lists reflect dramatically many of the important elements of progress

achieved by both dental education and the profession of dentistry during the period of 1875-1961.

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At some time during the centenary period of 1961-65, the **Journal** will publish a report on the alumni of the Baltimore College of Dental Surgery who served in the Civil War. At present the roster is 65, with a preponderantly Confederate affiliation. This report will constitute an interesting and valuable chapter of the history of the first dental college.

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Elsewhere in this issue attention is given to the career of Lester Noble (1850). His younger brother, Henry Bliss Noble (1857), also deserves an inclusive notice as an outstanding graduate of the B. C. D. C. He was born in Blandford, Mass., on May 20, 1832 and died in Washington, D.C., on March 5, 1902. He entered the B. C. D. S. after a preceptorship in his brother's office. Following graduation he began his long career of practice in Washington. He was president of the Dental Association of Maryland



and the District of Columbia (1880); a founder and president (2 terms) of the District of Columbia Dental Society; president of the Washington City Dental Society; and for several years treasurer of the National Dental Association of the United States of America.

Dr. Noble was a member of the District of Columbia Board of Dental Examiners from its organization till his death and was one of the 3 incorporators of the National Association of Dental Examiners (1896). He served as a special lecturer at his alma mater and Professor of Clinics at the Dental Department of Columbia University. In 1883 he achieved wide recognition because of his bringing a test case before the Supreme Court of the District of Columbia to obtain the exemption of dentists from jury duty. He was the preceptor of Robert T. Freeman, a member of Harvard's first entering class, who became the first American Negro to receive the dental degree in the United States.

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Perhaps the classiest professional address ever possessed by an alumnus is that of W. Frank Evans, Jr. '56—305 **Doctors Gardens**. Dr. Evans is practicing in Sarasota, Florida, his home town.

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Considering that the many items presented in the first Files Column included mention of scores of alumni, it is interesting to record that only one error has been called to my attention. Dr. James H. Ferguson '15 (B.C. D.S.) kindly reminded me that I had inadvertently omitted the name of J. Stephenson Hopkins '05 (U. of M.) from the list of alumni who had ac-

complished exceptional records as members of state boards. Dr. Hopkins, of Bel Air, Md., was a member of the Maryland State Board of Dental Examiners from 1916 to 1939. He was president of the Maryland State Dental Association, 1925-26.

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Three of our alumni were ordained ministers.

Dr. Isaac Josiah Wetherbee '50, the son of a minister, was ordained in 1841 at North Hampton, N.H. He held pastorates in Kittery, Me., and Charlestown, Mass. Forced by ill health to abandon his ministerial career, he decided to follow a natural predilection for dentistry and entered the B. C. D. S. Dr. Wetherbee had a remarkable career in his second profession and merits recognition as a very distinguished alumnus. Following his death in 1902 a memorial tablet was placed at the Tufts College Dental School—"Given by the Alumni of the Boston Dental College and the Tufts College Dental School in recognition of his self-denying constancy and devotion to the college and the Profession."

Dr. John Francis Poulton '71, of Warrenton, Va., was a Methodist minister who, in addition to his dental practice, acted as a supply pastor. Dr. Poulton served in the Civil war as the Chaplain of Company A, 38th Regiment of Virginia Infantry.

Dr. George Fouke '77 (Maryland Dental College), of Westminster, Md., was graduated from Gettysburg College. While principal of Waynesboro Academy he prepared for the Lutheran ministry at the Gettysburg Theological Seminary. After a brief career he was compelled to retire from the ministry because of throat trouble.



He resumed teaching and at the same time studied dentistry. In 1848, at the age of 31, he began his 48-years' practice in Westminster. He served terms on the City Council and was for several years a member of the Board of Visitors of the B. C. D. S. It is a noteworthy fact that he received his D. D. S. degree 29 years after beginning his practice.

The minister-dentist careers of Wetherbee and Fouke are good illustrations of a rather common factor in the development of American dentistry in the nineteenth century. Ministers, teachers and men from other walks of life who were afflicted by poor health were encouraged to adopt the practice of dentistry as a salubrious form of activity.

I wonder how many alumni there are who can name 12 dentists who played baseball in the majors. My records, which may be incomplete as regards this classification, include these 12 who have had careers in both dentistry and major league baseball: John Frederick Anderson, Albert John Bushong, David Charles Danforth, Michael Joseph Doolan, Edward Stephen Farrell, Thomas Fitzgerald Healy, Richard Carleton Hoblitzell, Edward Francis Lafitte, Louis Alfred Leggett, James Thompson Prothro, Frank Carl Reisling and Guy Harris White. Three of these 12 are graduates of Maryland, a very impressive representation.

John F. Anderson '09 (U. of M.) was born in Calahan, N. C., in 1887. He died in Winston-Salem, N. C., on November 8, 1957. After graduation from Maryland he pitched for the Wilson, N. C. club and at the end of the 1909 season was signed by the Boston Red Sox. His big league

record includes 53 wins and 57 losses. He was with the Red Sox in 1909 and 1913; Buffalo (Federal League) 1914 and 1915; New York Giants 1916-18. His best year was 1915 when he won 19 and lost 13. Dr. Anderson was a graduate of Davidson College and served in the Army Dental Corps in World War I.

Born in Granger, Texas, in 1890, Dave Danforth '15 (U. of M.) began his long baseball career as the star pitcher of his high school team. During the 1910 and 1911 seasons he pitched for the crack teams of Baylor University. In 1911 Baylor won the Texas Collegiate Championship, with Danforth winning all 10 of his games and hurling a no-hit, no-run game in the climactic contest of the year. From Baylor Dave went to the big time when he joined Connie Mack's Athletics in the fall of 1911. Pitching in 14 games, he had a record of 4-1. In May of 1912 he was traded to the Baltimore Orioles, with whom he had a record of 40-39. The Orioles sold him to Louisville in August of 1914. As a result of his impressive showing with Louisville, which included the setting of an American Association strikeout record of 18 strikeouts against Kansas City, he was purchased by the White Sox in August 1915. With that club he had a record of 23-29, plus a 1-inning appearance in the 1917 World Series. After 2 great years with Columbus of the American Association—13-12 in 1920 and 25-15 in 1921 (strikeouts 188 and 204)—Danforth was sought by 12 major league clubs. The Saint Louis Browns landed him by giving up 11 players in exchange. In 1922, with a 5-2 record for the Browns, Dave was sent to Tulsa of the Western League, where he won 6 and lost



4. Recalled by Saint Louis he had records of 16-14, in 1923, 15-12 in 1924, and 7-9 in 1925. Between 1925, his last year in the majors, and 1932 Dave Danforth pitched for several minor league clubs. But there was a little more glory to be achieved in those fading years of an amazingly long pitching career. With Milwaukee in 1925, 1926, and part of the 1927 season, he moved on to New Orleans (1927-29). Released by Dallas early in 1930 he caught on with Buffalo. Pitching for the Bisons against Rochester, he established a new International League strikeout record of 20. His 1931 season was divided between Buffalo and Chattanooga. In 1932 having been sent from Buffalo to Scranton (N. Y.-Penn. League), Dave decided to retire. He returned to his home in Baltimore and the prospect of opening an office for the practice of a profession that he had held in reserve for 17 years.

Michael Doolan '22 (B. C. D. S.) was born in Ashland, Pa., on May 7, 1880. He played in the big leagues from 1905 through 1918, except for 1917. For nine years he was the regular shortstop of the Philadelphia team in the National League, averaging about .236 at bat. He jumped to the Baltimore team of the Federal League in 1914, leaving that club late in the 1915 season to finish with Chicago in the same league. In 1916 he was with the Chicago Cubs and the New York Giants as a utility player. He finished his major league career at 38, playing second base in 92 games with Brooklyn. Mike Doolan had a very unusual experience as a student at the B. C. D. S., for his attendance was spread over a wide span of years to 1922, when he

was graduated at 42. (The writer's efforts to learn more about Dr. Doolan from dental and baseball sources have been abortive).

One of the most remarkable records of professional activity in the history of American dentistry was achieved by Charles A. Meeker '84 (B. C. D. S.), of Newark, N. J. Dr. Meeker was born in Troy, N. Y., on July 13, 1846, and died in Newark, N. J., on September 8, 1913.

One of the founders of the New Jersey State Dental Society in 1870, he served as its President (1878), and as its Secretary for 36 years. He was also a founder of the Central Dental Association of Northern New Jersey, to which he rendered faithful service as President and as Treasurer, holding the latter office for 29 years. Dr. Meeker was given the major credit for the development of local dental societies in New Jersey.

He was a member of the New Jersey State Board of Dental Examiners for 20 years (1893-1913) and its Secretary for 11 years. As a member of the National Board of Dental Examiners, he held the offices of Secretary and President.

Dr. Meeker was credited with the inception and the promotion of the World's Columbian Dental Congress in 1893. He also drafted the plan of its organization. He attended the Third International Congress (Paris, 1900) as the delegate from his state society and was the Vice-President for New Jersey of the Jamestown Dental Congress in 1907.

From 1907 till his death in 1913 he published monthly **The Dental Scrap Book**. He was one of the founders of the Newark Free Dental Clinic.



He held the offices of Secretary and Treasurer of the Interstate Dental Fraternity. He helped to found the American Academy of Dental Surgery in 1884 and was its Secretary.

Dr. Meeker graduated from the B. C. D. S. at 37, having practiced for many years before his matriculation. He was President of the Alumni Association of the B. C. D. S. (1895-6) and served on the faculty of his alma mater as a clinical instructor.

On January 11, 1908, Dr. Meeker was given a testimonial dinner at the Hotel Waldorf-Astoria in New York by 125 representatives of dentistry from the North, East, West and South in recognition of "his devotion to the advancement and elevation of dentistry." On October 21, 1912, he was tendered a testimonial dinner in Newark in honor of "his long devotion to the cause of dentistry in New Jersey.

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On the wall of the entrance hall of the School there is a Memorial containing the names of graduates of the B. C. D. S. who gave their lives in the service of their country. Dedicated in March 1943, the Memorial pays tribute to Alexander, Feindt, Friedberg, Gorsuch, Trojakowski, Wieland (World War II) and Baido (Korean War). Should not this impressive Memorial also list the names of the 5 graduates who are cited below.

Israel Francis Disoway '57, of Petersburg, Va., enlisted in the spring of 1862 as a private in Company E (Petersburg Riflemen) of the Twelfth Virginia Regiment. Dr. Disoway was killed at the battle of Spottsylvania Court House in May of 1864.

Harold Jeremiah Foley '14 (U. of M.), of Springfield, Mass., died in Demming, New Mexico, while on active duty with the Army as a First Lieutenant. His unit constituted a part of the punitive expedition against Villa.

Arthur A. Rehm '13 (B. C. D. S.), a native of Meriden, Conn., was commissioned a Lieutenant (j. g.) on February 13, 1914, at the Norfolk Navy Yard. His first 3 assignments were to the U. S. Ships *Dixie*, *Seattle* and *Melville*. At the beginning of our country's participation in World War I, he was ordered overseas with the first squadron of torpedo boats. After serving overseas for 15 months he was ordered home to organize the Bureau of Dental Supplies. Dr. Rehm died on October 20, 1918, at the U. S. Naval Hospital in Washington, D. C. Shortly before his death he had been promoted to the rank of Lieutenant Commander.

Abraham Livingston '18 (U. of M.), of Charleston, S. C., was killed in France in 1918.

Nathan L. Soule '03 (B. C. D. S.), of St. Albans, Vt., fought with the Canadian Army in World War I. He was killed in battle near Amiens in 1918 and was buried at Bonferit, France.

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Dr. Eugene William O'Brien '10 (B. M. C.), of Lawrence, Mass., retired in 1955 (at 70) after serving 40 years as the Supervisor of School Dentistry.

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As far as we know, Dr. Dilwin G. Varney, of Massachusetts, is the only alumnus who was a Forty-Niner. In 1854 he left for the Sandwich Islands on a vessel that was never heard from after leaving port.



## SKINNER'S TREATISE ADDED TO GRIEVES COLLECTION

After many years of diligent effort the School of Dentistry has finally been able to obtain Richard Cortland Skinner's *A Treatise on the Human Teeth* New York (1801), the first dental book printed in the United States. Originally sold for thirty cents, the book is now priced at several thousand times that amount.

Before coming to this country in 1789 Skinner had studied dentistry in London with Bartolomeo Ruspini. After a short period of practice in Philadelphia, he moved to New York in 1791, where he remained till his death in 1834. Following the custom observed by many of his leading contemporaries, Skinner made brief practice visitations to Baltimore, Hudson, Norfolk and Hartford.

Shortly after the opening of the Dispensary of New York in 1791, Skinner proffered his services so that he might render dental services at the Dispensary to the indigent of the city. The acceptance of this offer led to the establishment of this country's first dental clinic. In addition to his dental practice Skinner substituted "artificial eyes in such a manner, as to hide the deformity occasioned by the loss of an eye, and which cannot be distinguished by strict inspection from the natural eye." He claimed to be "the only operator in America that can Substitute or Set Artificial Eyes."

The *Treatise*, placed on sale June

20, 1801, is an enlarged edition of an earlier work, not copyrighted, which Skinner began to distribute to the public gratis in 1794. The *Treatise* is a pamphlet of 26 octavo pages written especially for the instruction of the public on the principles of oral hygiene. In his Preface Skinner states: "The author has endeavored to combine perspicuity with utility, concisely explaining the causes of disease and decay of the human teeth, their remedies, and only sure and certain method of preservation."

The book is divided into these subjects: Of the Structure of the Teeth; Of the Eruption of the Teeth; Of the Disorders of the Teeth, and General Causes of Decay; Of the Caries, or Decay of the Teeth; Of the Alveoli, or Sockets; Of the Scurvy in the Gums; Of Abscesses in the Sockets or Gums; Of the Tartar and Septic Acid; and Directions for Extracting Teeth, etc.

Skinner gave effective advice to parents concerning the care of their children's teeth. As an advocate of saving the teeth, he pioneered in preventive dentistry.

The *Treatise* has been placed in the Grieves Dental Historical Collection which is in the first alcove of the historical room of the new Health Sciences Library. The Grieves Collection is recognized as being one of the finest collections of dental books in the world.



## STANLEY '48 HONORED BY GORGAS

The Gorgas Odontological Society, probably the oldest undergraduate dental honorary society, held its annual dinner at the new Sheraton-Baltimore Inn, on April 14. Dr. Myron S. Aisenberg, Dean, was the toastmaster and also presented Gorgas keys and certificates to the senior members.

An impressive feature of the program was the first presentation of the Gorgas Award to an alumnus of the School who has made an outstanding record of contribution to the art and science of dentistry. This Award was presented by George J. Goodreau, President of the Society, to Dr. Harold Russell Stanley, Jr., of the Class of 1948.

Since his graduation Dr. Stanley has been associated with the United States Public Health Service and is now Assistant Chief of the Clinical Investigations Branch of the National Institute of Dental Research. He has contributed prolifically to the literature on oral pathology and has addressed and presented clinics before a large number of national, state and local dental societies.

Dr. Stanley, who received the Alumni Award for Thesis, stated that the research conducted in relation to the thesis had been the primary motivating factor in his choice of a career in oral pathology research.





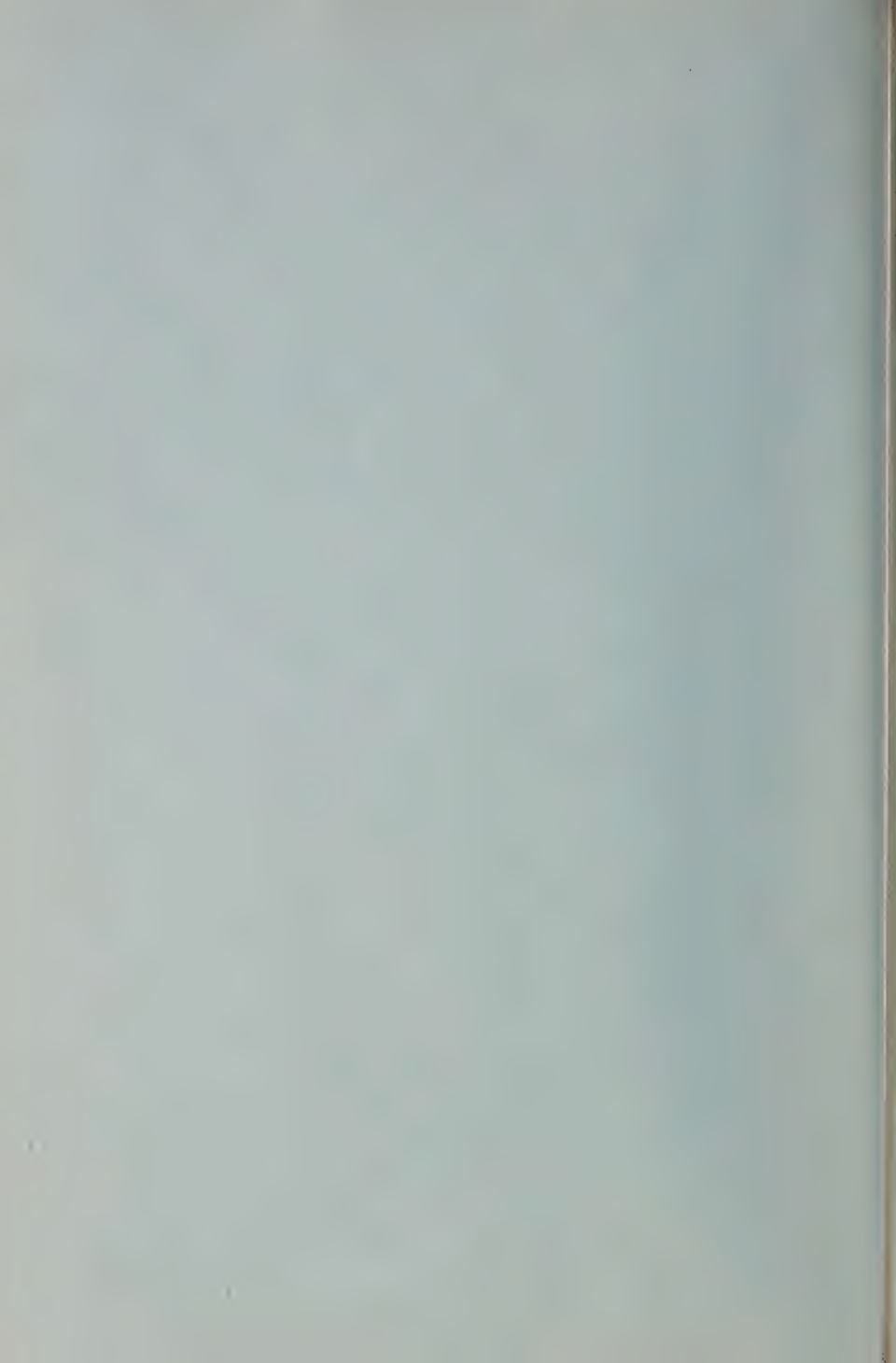














# *The* JOURNAL *of the*

BALTIMORE COLLEGE OF DENTAL SURGERY  
DENTAL SCHOOL • UNIVERSITY OF MARYLAND



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## **TENTATIVE COMMENCEMENT PROGRAM**

### **WEDNESDAY, JUNE FIFTH**

6:30 p.m.—Caswell Room, Lord Baltimore Hotel

#### **OMICRON KAPPA UPSILON (PHI CHAPTER)**

Banquet and Convocation

### **THURSDAY, JUNE SIXTH**

Student Union Building — Baltimore Campus

9:00 a.m.—Meeting of the Board of Trustees

10:30 a.m.—Registration of Alumni

11:00 a.m.—Annual Business Meeting of Alumni Association

12:00 noon—Golf Tournament

Hillendale Golf Course, Phoenix, Maryland

#### **REUNION DINNERS FOR CLASSES OF**

|      |      |
|------|------|
| 1913 | 1938 |
| 1918 | 1943 |
| 1923 | 1948 |
| 1928 | 1953 |
| 1933 | 1958 |

### **FRIDAY, JUNE SEVENTH**

9:30 a.m.—Health Sciences Library Auditorium  
Academic and Awards Program

12:00 noon—Student Union Building  
Luncheon

2:00 p.m.—Scientific Session, Room 37  
School of Dentistry Building

6:30 p.m. - 1:00 a.m.—Sheraton-Belvedere Hotel  
Cocktails, Dinner and Dancing

### **SATURDAY, JUNE EIGHTH**

Morning Graduation Exercises—College Park, Maryland



## FACULTY ACTIVITIES

(This is a report on the varied activities of the faculty members during 1962.)

Dr. Myron S. Aisenberg, Dean, spoke to the predental students of the University of Maryland on "Personality Traits of Predental Students" (March 15). On March 25 Dr. Aisenberg participated in a symposium on "Oral Cancer" at the Henry Ford Hospital in Detroit. At the Baltimore VA Hospital, on April 18, he discussed "Oral Lesions of Medical-Dental Interest" and on May 16, in Baltimore, presented a paper before the American Academy of Dental Medicine on "Repairs Following Root Canal Therapy, Bone Resorption, Adaptation, Tooth Fracture." During the period September 10-14 Dr. Aisenberg discussed "Oral Cancer" before medical-dental groups in 5 Michigan cities: Sault Sainte Marie, Marquette, Houghton, Ironwood, and Escanaba. He also spoke on this subject to the Wichita (Kansas) Dental Society. He was elected for a second term of 6 years to the American Board of Pathology and also to the Executive Board of the Maryland Division, American Cancer Society.

Dr. Grayson W. Gaver, Professor of Dental Prosthesis, served as a consultant in prosthesis to the VA Hospital at Fort Howard, Md. On November 27 he presented a television clinic on "Immediate Denture Construction" sponsored by the Baltimore County Dental Society. Dr. Gaver was honored by the New Jersey Alumni Association at its annual meeting held in Newark on November 28 when the Association presented him with a citation as an Honorary member.

Dr. Ernest B. Nuttall, Professor of Fixed Partial Prosthesis, presented

papers before several meetings: January 16, Lancaster County (Pa.) Dental Society — "Present Concepts in Fixed Prosthodontics"; March 13, Monmouth County (N. J.) Dental Society—"Rationale for Restorative Dental Service"; March 21, New River (W. Va.) Dental Society — "Current Concepts in Restorative Dentistry"; May 16, Dental Society of Chester and Delaware Counties (Pa.)—"Rationale for Fixed Restorative Dental Service"; October 17, Maryland State Dental Association—"Management of Routine Problems in Fixed Restorative Dentistry"; October 26, American Prosthodontic Society (Miami Beach)—"The Principles of Obtaining Occlusion in Occlusal Rehabilitation." He gave two series of lectures before classes at the Walter Reed Army Medical Center: February 5, "Restorative Dentistry: Crown and Bridge" and August 15, "Fixed Partial Prosthodontics." Dr. Nuttall attended the VA meeting in association with that of the American Hospital Association, held in Chicago, February 16; and the meetings of the American Academy of Restorative Dentistry and the Chicago Dental Society, February 17-18. On November 14 he participated in a Crown and Bridge symposium at the Indiana University School of Dentistry. He presented a series of lectures on Crown and Bridge Prosthodontics at the U.S.P.-H.S. Hospital (Baltimore), September 12, 19, 26 and November 21. Dr. Nuttall was installed as President of the American Academy of Crown and Bridge Prosthodontics at the February meeting of the Academy. In April he was appointed Vice-Chairman of the Section on Partial Prosthodontics for the 1963 ADA meet-



ing. From July 1 - August 4 Dr. Nuttall was a visiting professor at the Faculdade de Odontologia de Universidade do Rio Grande do Sul in Brazil, where he gave a comprehensive course in Fixed Partial Prosthodontics to 17 teachers from 9 dental schools. At the Triennial Meeting of the Alumni Association held in March he presented a television clinic on "Parallel Pin Retention." On September 28 he was the School's representative at the dedication ceremonies of the University of Kentucky, College of Dentistry. Dr. Nuttall is Chairman of the Council on Finance of the Maryland S.D.A. and is a member of the Committee on Health and Medical Services of the Maryland State Commission on the Aging.

Dr. Kyrle W. Preis, Professor of Orthodontics, spoke on January 15 at Mount Saint Agnes College, Baltimore, on "Habits and Posture as Related to Facial Development and Dental Occlusion," supplemented by a motion picture "Habits in Action." On May 17 he presented before the Richmond (Va.) Pediatric Society a paper on "Oral Habits Which Affect Facial Development," presenting also "Habits in Action." He was an essayist and clinician at the meeting of the South Carolina Orthodontic Society, held at Pawley's Island on September 19. Dr. Preis served as Chairman of the Maryland Section of the American College of Dentists and as Deputy Regent of the Fourth District, International College of Dentists.

Dr. Donald E. Shay, Professor of Microbiology, published two collaborative papers: "Some Observations on the Effects of Cholesterol Derivatives on Microorganisms" (with R. F. Smith and N. J. Doorenbos) and

"Resistance Studies of Nasal Staphylococcal Isolates" (with Anna L. DeHaven), both in *Proceedings of the Pennsylvania Academy of Science*. He presented two papers: "Graduate Study in Microbiology," Rho Chi (School of Pharmacy honorary society), February 20; and "The Effect of Synthetic Steroids on Microorganisms," Carnegie Institute (Pittsburgh), April 13. Dr. Shay is President of the Baltimore Chapter, International Association for Dental Research; he is Chairman of the Technical Committee of the Anne Arundel Science Seminar and also of the Membership Committee, American Society for Microbiology.

Dr. Douglas J. Sanders, Professor of Pedodontics, attended two workshops held in Detroit: that for Dental Manpower, January 8-12, and that for Pedodontic Teachers, April 17-20. He presented a paper on "Behavior Management," Rhode Island Society of Dentistry for Children, February 5; spoke on "Oral Health" to the students of the Westowne Elementary School (Baltimore), March 22; and gave a table clinic on "Parallel Pin Castings for Fractured Anterior Teeth in Children," Maryland State Dental Association, May 8. Dr. Sanders is a member of the Maryland Joint Council to Improve the Health Care of the Aged and participated in the meeting of the Council on Dental Health, held in Chicago, April 30 - May 2. He continues to serve on the editorial staff of the magazine **Highlights for Children**. Dr. Sanders is a consultant in pedodontics at the U.S.P.H.S. Hospital in Baltimore and is a member of the staffs of University, Franklin Square and Bon Secours Hospitals. He is Chief of Den-



tistry at the St. Francis School for the Handicapped.

Dr. José E. Medina, Professor of Operative Dentistry, published two articles: "A Philosophy of Dental Practice" in *The Journal of the American Academy of Gold Foil Operators* (May) and "Clinical Operative Dentistry Teacher's Responsibility for Correlation of Biological and Clinical Sciences" in the *Journal of Dental Education* (September). He presented papers before an impressive number of organizations: January 3, "A Philosophy of Dental Practice," Psi Omega (Baltimore); January 16, "The Prevention of Amalgam Failures," Rhode Island State Dental Society (Providence); March 2-3, "Operative Dentistry," Davis Research Study Club (Boston); April 13-15 and September 28-30, "Class V Restorations" (papers, clinical demonstration and supervision), George M. Hollenback Operative Dentistry Seminar (Charleston, W. Va.); April 27-29, "Class V Restorations," New England Study Club of Dentistry (Boston); April 30, "The Practice of Operative Dentistry," Massachusetts State Dental Society (Boston); October 4-7, "Class V Restorations," Central Florida Gold Foil Study Group (Orlando); October 15, "The Use of High Speed in Operative Dentistry," Harford-Cecil County Dental Society (Aberdeen, Md.); November 2, "Comparative Evaluation of Elastic Impression Materials," Puerto Rico Dental Association (San Juan); November 16-18, "Class III Restorations" (papers, clinical demonstrations and supervision), New England Study Club of Dentistry (Boston); November 20, "Newer Concepts in Amalgam Restorations," Mercer County Dental Society (Trenton, N. J.). On Febru-

ary 27 and September 6, Dr. Medina lectured on "Amalgam Restorations" in the Advanced Dentistry Course at the Walter Reed Army Medical Center. In March he attended the meeting of the International Association for Dental Research and represented the School at the meeting of the American Association of Dental Schools (both at St. Louis). At the latter meeting he presented a paper on "Clinical Operative Dentistry Teacher's Responsibility for Correlation of Biological and Clinical Sciences." He also attended the meeting of the American Academy of Gold Foil Operators held in Birmingham, Ala., November 2-5. On September 10 he attended a course in occlusion given at the National Institutes of Health (Bethesda). At the meeting of the Federacion Odontologica de Centro America y Panama, held in Panama City, Panama, January 20-27, Dr. Medina presented papers on "The Prevention of Amalgam Failures," "Important Clinical Considerations When Using High Speed" and "Comparison of Elastic Impression Materials." He served as Editor of the *Journal of the American Academy of Gold Foil Operators*.

Dr. Calvin J. Gaver, Associate Professor of Operative Dentistry, was reelected secretary of the Alumni Association. On January 30 he presented a table clinic on "Class V Ferrier Preparations," Baltimore County Dental Society, and, on February 13, presented a paper on "Restoration of Badly Mutilated Posterior Teeth" before the Eastern Shore Dental Society (Salisbury, Md.). He attended a course offered by the L. D. Caulk Company at Milford, Del., June 25-27.



Dr. J. Philip Norris, Assistant Professor of Oral Medicine, was elected to the Executive Councils of the Alumni Association and of the Baltimore City Dental Society; Secretary-Treasurer of Phi Chapter, Omicron Kappa Upsilon; Grand Master of Oriole Chapter, Psi Omega; and Chief Correspondent, **Journal of the Maryland State Dental Association.**

Dr. Francis A. Veltre, Instructor in Operative Dentistry, attended a course given by the L. D. Caulk Company, June 25-27. Dr. Veltre, on May 20-23, presented a table clinic on "Pin Retention in Amalgam," Pennsylvania State Dental Society (Galen Hall).

Dr. Henry J. Bianco, Instructor in Operative Dentistry, attended a course at the L. D. Caulk Company in Milford, Del. On January 30 he presented a table clinic on "Class V Ferrier Preparations," Baltimore County Dental Society. In July Dr. Bianco began a one-year leave absence for the continuance of his studies toward securing the M.S. degree.

Dr. José H. Diaz, Assistant Professor of Operative Dentistry, attended a course given by the L. D. Caulk Company at Milford, Del.

Dr. David W. Heese, Instructor in Operative Dentistry, in collaboration with Dr. Veltre, gave a table clinic on "Pin Retention in Amalgam," Pennsylvania Dental Society meeting, May 20-23. Dr. Heese attended a course given by the L. D. Caulk Company of Milford, Del.

Dr. Irving I. Abramson, Associate Professor of Oral Medicine, presented three papers: in January, American Association of Endodontists (Miami)—"Frank Appraisal of the Culture

Technique"; in April, Greater Northeast Dental Society (Philadelphia)—"Endodontics: An Aid in the Practice of Dentistry"; and, in December, Greater New York Meeting—"Endodontics: An Aid in Fixed Partial Prosthesis." He gave two all-day postgraduate courses: in April, Essex County Dental Society (Newark, N. J.)—"Endodontics for the General Practitioner" and, in May, at the Childrens Hospital (Baltimore)—"Pulpotomy and Apical Surgery." At the Greater New York Meeting he also gave a registered clinic (three sessions) on "Endodontics: Why, When, Where and How." Dr. Abramson attended the ADA meeting at Miami Beach as a Maryland delegate. He was elected to the Board of Governors of the Maryland S.D.A.; Secretary-Treasurer of the Maryland Section, American College of Dentists; and to the Executive Board of the American Association of Endodontists.

Dr. William Kress, Assistant Professor of Orthodontics, was elected Vice-President of the Middle Atlantic Society of Orthodontists and President-Elect of Phi Chapter, Omicron Kappa Upsilon.

Dr. Joseph J. Giardina, Instructor in Pedodontics, attended the Conference on Training Dental Students to Use Dental Assistants, held in Chicago, April 25-29. On May 8, Dr. Giardina presented a table clinic on "Parallel Pin Castings for Fractured Anterior Teeth in Children," Maryland State Dental Association.

Dr. Joseph P. Cappuccio, Associate Professor of Oral Surgery and Anesthesiology, presented several papers: April 25, Lehigh Valley Dental Society (Allentown, Pa.)—"Problems of



Exodontia in Dental Practice" and "Dysfunctions of the Temporomandibular Joint"; May 15, Hanover (Pa.) Dental Society—"Problems of Oral Surgery in Dental Practice"; November 13, Third District Dental Society (Hudson, N. Y.)—"Problems of Oral Surgery in Dental Practice." He also presented two clinics: March 4-7, Postgraduate Clinic (Washington, D. C.)—"Surgical Preparation of the Oral Cavity for Dentures"; November 28, New Jersey Alumni Section (Newark)—"Preparation of the Oral Cavity for Dentures." On March 10 he spoke at the annual dinner meeting of Gamma Lambda Chapter of Psi Omega, Columbia University School of Oral Surgery. Dr. Cappuccio was chairman of the Political Action Committee of the Maryland S.D.A. and attended the ADA meeting at Miami Beach as chairman of the Maryland delegates. He was elected Vice-President of Phi Chapter of Omicron Kappa Upsilon; Councillor of the Maryland Section of the International College of Dentists; and Program Chairman of the Middle Atlantic Society of Oral Surgeons. Dr. Cappuccio was appointed to the Oral Surgery Staff at Mercy Hospital and was oral surgery consultant to the National Association on Standard Medical Vocabulary.

Dr. Wilbur O. Ramsey, Professor of Dental Prosthesis, presented three papers: January 30, Baltimore County Dental Society — "The Atrophic Mandibular Ridge"; February 13, Eastern Shore Dental Society (Salisbury, Md.)—"Problems in Complete Denture Construction"; April 10, Albany (N. Y.) Dental Society—"Functional Analysis of the Temporomandibular Joint." He also spoke before

three other groups; July 18, Rotary Club of Catonsville—"Medical Hypnosis"; October 3, Hampton Elementary School (Towson, Md.)—"Your Teeth and You"; October 9, Gorgas Odontological Society — "Atypical Denture Prosthesis." In February and March Dr. Ramsey gave a postgraduate course in "Removable Partial Denture Prosthodontics" to the Baltimore City Dental Society. On February 14 he presented a table clinic on "Custom Mouth Guards," Baltimore City Dental Society. He participated in a conference sponsored by the Dental Laboratory Operators of Baltimore, July 21. In October he gave five lectures as a consultant to the U.S.P.H.S. Hospital (Baltimore). Dr. Ramsey is a representative of the dental profession in the National Association on Standard Medical Vocabulary and is the representative of the Baltimore City Dental Society to the Baltimore Association of Commerce.

Dr. George W. Piavis, Associate Professor of Anatomy, gave a demonstration on "Neuroanatomical Visual Aids Produced with Paints and Plastic" at the annual meeting of the American Association of Anatomists, held in Minneapolis, March 20-23. Dr. Piavis published a paper on "Exposure of Several Developmental States of the Sea Lamprey" in the September issue of *Copeia*.

Dr. Francis J. Kihn, Instructor in Pedodontics, presented a table clinic on "Parallel Pin Castings for Fractured Anterior Teeth in Children" at the meeting of the Maryland State Dental Association, on May 8.

Dr. Sterrett P. Beaven, Instructor in Operative Dentistry, attended a course at the L. D. Caulk Company, June 25-27.



Claude P. Taylor, Director of Visual Education, was the General Chairman of the combined meeting of the Biological Photographic Association, Maryland Industrial Photographic Association, Association of Federal Photographers, and Professional Photographers of Maryland, held in the Student Union Building on May 16.

Leah M. P. Staling and Dr. Jerome D. Buxbaum, instructors in the Department of Physiology, presented a joint effort at the Greater New York Meeting in December. Mrs. Staling presented the basic research on "An Electromyographic Analysis of the Muscles Controlling the Temporomandibular Joint" and Dr. Buxbaum spoke on "The Relationship of These Data to Clinical Problems."

Dr. Samuel H. Bryant, Assistant Professor of Oral Diagnosis, was elected to these offices: President-Elect of the Maryland State Dental Association and President of Phi Chapter, Omicron Kappa Upsilon.

Dr. Philip Smith, Instructor in Oral Diagnosis, presented two table clinics: "Oral Diagnosis for the General Practitioner," at the Triennial Meeting of the Alumni Association (March) and "White Lesions of the Oral Cavity," at the Maryland S.D.A. meeting on May 8. He presented a paper on "Herbals: Their Relation to Dentistry" at the meeting of the American Academy of the History of Dentistry, held at Miami Beach, October 26. Dr. Smith is Chairman of the Library Committee of the Baltimore City Dental Society.

Dr. Edward C. Dobbs, Professor of Pharmacology and Therapeutics, published five papers: "Recent Advances in Dental Therapeutics"—**New Jersey**

**Journal of Dentistry**; "Carbocaine Without Vasoconstrictor"—**Journal of Oral Surgery, Anesthesia, and Hospital Dental Service**; "A Clinical Evaluation of Trimethobenzamide (Tigan) as an Antigagging Drug"—**Journal of Dental Research**; "The Prevention and Treatment of Dental Office Emergencies"—**Journal of the American Dental Hygienists Association**; "An Evaluation of 2-Chloroprocaine as a Local Anesthetic Agent in the Dental Office" (with Dr. Frank A. Dolle, Assistant Professor of Pharmacology and Therapeutics)—**Journal of the American Dental Society of Anesthesiology**. On February 8 Dr. Dobbs appeared on the Prudence Penny Show, WBAL-TV, speaking on "Proper Diet for Dental Health." He also presented three papers: March 20, Lancaster County (Pa.) Dental Society—"Drugs of Dental Interest"; May 20, Senior Class of the School of Pharmacy, University of Maryland—"Drugs Used for the Control of Pain in Dentistry"; October 16, Mercer Dental Society (Trenton, N. J.)—"Recent Advances in Oral Therapeutics." Dr. Dobbs contributed the chapter on "Drugs Which Act on the Skin and Mucous Membranes" to the **Dental Clinics of North America** and the chapter on "Pharmaceutical Compounding of Dental Products" to **Pharmacotherapeutics of Oral Diseases**, published by the McGraw-Hill Co.

Dr. Joseph H. Seipp, Jr., Instructor in Histology and Embryology, was elected editor of **Alma Mater**, the publication of the Alumni Association. On February 13 Dr. Seipp, in collaboration with other orthodontists, presented a table clinic at the Baltimore City Dental Society meeting. He is



Chairman of the Public Relations Committee of the Society.

Dr. Alvin F. Gardner, Associate Professor of Pathology, contributed **Oral Findings in Experimental Lathyrism** to the monograph series published by the New York Academy of Science. He lectured to the staff of the Institute of Experimental Medicine and Surgery of the University of Montreal on "Histochemistry of Experimental Lathyrism"; to the staff of the U.S.P.H.S. Hospital (Baltimore), on "Oral Pathology"; and to the staff of the Mt. Alto VA Hospital, on "Oral Cancer." In April he conducted a postgraduate course in "Oral Biological Aspects of Clinical Endodontics" for the Baltimore City Dental Society. He served as Chairman of the Scientific Sessions for the annual meeting of the American Academy of Dental Medicine, held in Baltimore. At the meeting of the American Society of Oral Surgeons held in New Orleans, October 23-27, Dr. Gardner was awarded fourth prize in the Society's 1962 Research Award Contest. He attended the annual meeting of the American Association for the Advancement of Science, held in Philadelphia in December. Dr. Gardner achieved an initiatory listing in the **Dictionary of International Biography**, published in London.

Dr. H. Berton McCauley, Lecturer in Dental Public Health and Preventive Dentistry, has filled the office of Historian, Maryland State Dental Association, since 1958. Dr. McCauley was appointed in 1949 as the first full-time Director of the Bureau of Dental Care, Baltimore City Health Department. He is a consultant in Dental Public Health to the U.S.P.H.S. Hospital (Baltimore) and since 1957 has

served as a consultant member of the Committee on Dental Services of the State Council on Medical Care. He is a co-chairman of the Mass Oral Poliomyelitis Vaccine Program sponsored by the Baltimore City Health Department. Dr. McCauley, in collaboration with Tood M. Frazier and L. Paul Rivas, contributed "After Seven Years of Fluoridation" to the September number of the **Journal of the Maryland State Dental Association**.

Gardner P. H. Foley, Professor of Dental Literature and Dental History, was elected President of the American Academy of the History of Dentistry at its Miami Beach meeting on October 26. He continues as Chairman of the M.D.K. Bremner Award Contest sponsored by the Academy. He was reelected to the Board of Editors and as Assistant Editor of the **Journal of Dental Education**, published by the American Association of Dental Schools; Professor Foley regularly contributes the "Quarterly Post" column. He is the editor of the **Journal of the B.C.D.S.**, to which he contributes the column "From the Ranks of the File." He spoke on "The Story of Dentistry" to the Catonsville Kiwanis Club and to the Cosmopolitan Club of Baltimore. His article on "Adalbert Volck, Dentist and Artist," which originally appeared in 1949, was reprinted in **Dental Radiography and Photography**.

Dr. D. Vincent Provenza, Professor of Histology and Embryology, began in June a year's sabbatical leave. Dr. Provenza is engaged in research at the National Institute of Dental Research, Department of Histology and Pathology, National Institutes of Health. He attended three meetings: in March, the 40th meeting of the



I.A.D.R., in St. Louis; in August, the 5th International Congress for Electron Microscopy, in Philadelphia; in November, the 3rd Biennial Conference of Directors of the Graduate Training Program, National Insti-

tutes of Health, in St. Louis. Dr. Provenza was elected Vice-President of the Maryland Chapter of the Society of Sigma Xi and to the Executive Council of the Maryland Biological Society.

## STUDENT OFFICERS FOR 1962-63 YEAR

Senior Class: President, Paul M. Ladd, Miami, Fla.; Vice-President, Kenneth H. Webster, Kennewick, Wash.; Secretary, Ruth L. Hartman, Scottsville, Va.; Treasurer, Fred Scholnick, Baltimore. Student Senate Representatives: Stanley E. Hyatt, Baltimore; and Henry J. Van Hassel, Bel Air, Md.

Junior Class: President, Wayne L. O'Roark, Chevy Chase, Md.; Vice-President, John P. Hackett, Woodstown, N. J.; Secretary, Frank L. Fraser, Baltimore; Treasurer, David L. Mincey, Charlotte, N. C.. Student Senate Representatives: Thomas K. Guglielmo, Passaic, N. J., and Malcolm L. McInnis, North Dighton, Mass.

Sophomore Class: President, Wayne W. Wibby, Bangor, Me.; Vice-President, Robert J. Carey, Baltimore; Secretary, Carolyn E. Barclay, Towson, Md.; Treasurer, John J. Golski, Somerville, N. J.; Student Senate Representatives: James E. Bradley, Takoma Park, Md., and Vincent J. Zugay, Hyattsville, Md.

Freshman Class: President, Allan M. Dworkin, Baltimore; Vice-President, Jay C. Green, Baltimore; Secretary, Jurate E. Palubis, Baltimore; Treasurer, James W. Schiff, Harrington, Del. Student Senate Representatives: Thomas P. Conaty, Wilmington, Del., and Jack Earl Neal, Silver Spring, Md.

Alpha Omega: President, Martin N. Narun, Baltimore; Vice-President, Philip H. Pushkin, Baltimore; Secretary, Charles M. Rosenberg, Atlanta, Ga.; Treasurer, Fred Scholnick, Baltimore; Assistant Treasurer, Norman R. Ressin, Baltimore.

Psi Omega: Grand Master, David Bimestefer, Baltimore; Junior Master, John Patterson, Baltimore; Secretary, Paul W. Shaffer, Westernport, Md.; Treasurer, Robert T. Probst, Baltimore; Chaplain, Thomas Toman, Atlantic Beach, Fla.

Sigma Epsilon Delta: President, Stuart T. Landsman, Bronx, N. Y.; Vice-President, Victor E. Spiro, Quincy, Mass.; Secretary, Leroy Goren, Baltimore; Treasurer, Stanley L. Kolker, Baltimore.

Xi Psi Phi: President, Francis R. Richo, Madison, Conn.; Vice-President, George A. Kraft, York, Pa.; Secretary, John R. Savoia, Ludlow, Mass.; Treasurer, Norman M. Traub, Winter Haven, Fla.

Gorgas Odontological Society: President, Roger A. Webster, Fresno, Calif.; Vice-President, Dean C. Johnson, Bountiful, Utah; Secretary, Francis R. Richo, Madison, Conn.; Treasurer, Robert T. Probst, Baltimore; Historian, Richard A. Gallagher, Baltimore; Sergeant at Arms, Richard J. Landino, West Haven, Conn.

Interfraternity Council: President,



David Bimestefer, Baltimore; Vice-President, Stuart L. Landsman, Bronx, N. Y.; Secretary, Francis R. Richo, Madison, Conn.; Treasurer, Martin N. Narun, Baltimore.

Student Senate: President, John C. Pentzer, Silver Spring, Md.; Vice-President, James M. Carew, Hillsboro, N. H.; Secretary-Treasurer, Dean C. Johnson, Bountiful, Utah.

## A DAY OF POSTGRADUATE INSTRUCTION

The Postgraduate Division of the School presented on December 6 a day of postgraduate instruction to 20 members of the Hanover (Pa.) Dental Society. In order that the alumni may be informed of this important phase of instruction being developed by the faculty, the program for the Hanover group is given in detail. Dr. Donald E. Shay, Director of the Postgraduate Division, invites requests for information concerning this type of program, and programs that may be particularly suited to the needs of other groups.

9:30 - 10:45

Dr. José E. Medina, Professor and Head, Department of Operative Dentistry

### Operative Dentistry

The discussion will deal with the failures that may develop in amalgam restorations, emphasizing those factors or techniques which could have eliminated them. The presentation will also contain information relative to the newer techniques and concepts of amalgam manipulation. These new ideas will be evaluated, discussing their values, shortcomings, indications and contraindications.

10:45 - 11:00

Discussion and questions relative to Dr. Medina's presentation.

11:00 - 12:15

Dr. Brice M. Dorsey, Professor and Head, Department of Oral Surgery

### The Operation of a Dental Service in a Small General Hospital

This discussion will include the organization of a staff, extent of service, records, responsibility, use of general anesthesia, and auxiliary personnel.

12:15 - 1:15

Lunch—Student Union Building

1:15 - 2:15

Tours of the dental facilities in the Dental School and University Hospital, directed by Dr. Dorsey.

2:15 - 3:30

Dr. Douglas J. Sanders, Professor and Head, Department of Pedodontics

### Use of Auxiliary Personnel in the Dental Office:

#### The Chairside Dental Assistant

Concepts of the use of auxiliary personnel have changed considerably in recent years. The dental assistant has attained a more important position in the dental office. The evaluation of the chairside assistant as an invaluable member of the dental operating team will be discussed. The pilot program training dental students in the use of chairside dental assistants will be explained and a demonstration of the utilization of chairside assistants will be presented by the staff of the Pedodontics Department of the University of Maryland School of Dentistry.



3:30 - 4:15

Dr. Norton M. Ross, Associate Professor, Department of Pharmacology

**Preoperative and Postoperative  
Use of Tranquilizers:**

**New Antibiotics and Hemostatic  
Agents**

The use of the tranquilizing drug for premedicating nervous patients prior to a dental appointment has become a routine procedure in many dental offices. The patient arrives at the dental office physically and mentally relaxed and is more cooperative during the operative procedures. After the visit, tranquilizing drugs may be pre-

scribed to allay nervousness and to induce a restful night's sleep. They may be combined with analgesic drugs when pain is anticipated. The antihistaminic tranquilizers will reduce postoperative complications following surgery. The transitional period from natural teeth to their artificial prosthetic substitutes may be made more pleasant by prescribing moderate doses of tranquilizing drugs for a week or two.

4:15 - 4:45

Dr. Donald E. Shay, Professor and Head, Department of Microbiology  
**The Problem of "Hospital Staph"  
in the Dental Office**

## FACULTY CHANGES FOR THE 1962-63 YEAR

Dean Myron S. Aisenberg reports these faculty changes: the resignations of Drs. Charles A. Darby and Anthony J. Klein, Instructors in Roentgenology; Dr. Conrad C. Ferlita, Instructor in Pedodontics; Drs. Gene E. Camp and Chester J. Richmond, Instructors in Oral Surgery; Dr. John G. Goettee, Instructor in Fixed Partial Prosthesis; Dr. Michael E. Kolakowski, Instructor in Oral Medicine; Dr. James E. Palmer, Instructor in Oral Diagnosis; and Dr. James R. Crouse, Instructor in Operative Dentistry—the appointments of Drs. William J. Bowen and Frank Mastrola, Instructors in Operative Dentistry; Drs. Donald E. Lilley and Gilbert A. Vitek, Instructors in Pedodontics; Drs. Charles T. Pridgeon,

Associate Professor and Head of Department, and Michael V. Doran, Jr., Instructor, in Oral Medicine; Dr. Thomas M. Rutherford, Instructor in Oral Diagnosis; Dr. Francis G. Kirchner, Instructor in Fixed Partial Prosthesis; Drs. John P. Burton and McDonald K. Hamilton, Instructors in Oral Surgery; Drs. Gary H. Cohen and Louis Weiss, Instructors in Roentgenology; Dr. Sue-ning C. Barry, Assistant Professor in Histology and Embryology; and Dr. H. Berton McCauley, Lecturer in Public Health Dentistry.

Dr. Richard C. Leonard, formerly Instructor in Public Health Dentistry, retired at the end of the year after 33 years of faculty association.





JOHN J. SALLEY, D.D.S., Ph.D.



## DR. SALLEY TO SUCCEED DR. AISENBERG AS DEAN

In June of 1962 Dr. Myron S. Aisenberg, who became Dean of the School of Dentistry in 1954, announced his intention to retire at the end of the next academic year. On June 16 President Elkins appointed a committee of six to nominate Dr. Aisenberg's successor. The committee was headed by Dr. R. Lee Hornbake, Vice-President for Academic Affairs, and included five members of the School's faculty, all of them heads of departments: Biddix, Hahn, Preis, Vanden Bosche and White.

Initial efforts of the committee were devoted to the establishing of rules of procedure, to the outlining of point-of-view considerations, and to the developing of criteria for the guidance of its deliberations. In September the committee began its active program by contacting every known status person in the dental profession to invite recommendations and applications. The credentials in some form of seventy-seven possible candidates were examined. Eventually four of these men were brought to the School at well-spaced intervals. After an all-day schedule of interviews with the committee and with the heads of departments, each of these selected candidates was interviewed by President Elkins at College Park.

Early in March the committee made a unanimous report to the President. After a brief period of further inquiry based on resources of information available only to a University President, Dr. Elkins, on March 21, made public announcement of the appointment to the deanship of Dr. John J. Salley, Professor and Chairman of the Department of Oral

Pathology, Medical College of Virginia, School of Dentistry.

Dr. Salley was born in Richmond, Va., on October 29, 1926. After attending public schools in Richmond, he entered the Virginia Military Institute in 1943. At the end of his sophomore year he enlisted in the U. S. Army Air Force. Following a year's tour of service he spent the year of 1946-47 at the Richmond Professional Institute of the College of William and Mary. In 1947 he entered the Medical College of Virginia, School of Dentistry, which awarded him the D.D.S. degree in 1951. After three years of graduate study at the University of Rochester, School of Dentistry and Medicine, he received the Ph.D. degree in 1954.

During the full course of his graduate studies at Rochester, Dr. Salley was a U.S.P.H.S. Postdoctoral Fellow in Pathology. Also during this period he served as Instructor in Histology at the Eastman School of Dental Hygiene, 1952-1954. In 1954 he began his faculty affiliation with the Medical College of Virginia: Instructor in Pathology, Oral Diagnosis and Therapeutics, 1954-1955; Assistant Professor of Pathology and Dentistry, 1955-1959; Associate Professor of Pathology and Dentistry, 1959-1962; Chairman, Department of Oral Pathology, 1960-; Professor of Oral Pathology, 1962-. He has been Coordinator of Cancer Teaching at the School, 1956-, and a member of the Tumor Board, Medical College of Virginia Hospitals, 1956-.

Dr. Salley's wide range of dental interests and activities are evidenced by his many important extra-School affiliations: Dental Consultant, Office



of the Chief Medical Examiner, Commonwealth of Virginia, 1956-; Consultant in Oral Pathology, Richmond VA Hospital, 1959-; Consultant to National Institute of Dental Research, U.S.P.H.S., at Bethesda, 1960-; member of Advisory Editorial Board, **Journal of Dental Research**, 1960-1962; Chairman, American Cancer Society Institutional Grant Committee, Medical College of Virginia, 1960-; Consultant, National Board of Dental Examiners, 1961-; member of Dental Study Section, National Institutes of Health, 1962-.

In 1953 Dr. Salley received the Novice Award, International Association for Dental Research, and in 1961, the Outstanding Civilian Service Medal, Department of the Army. He is a member of Sigma Zeta Science Society (1950), Omicron Kappa Upsilon (1951), and Sigma Xi (1954). He also holds memberships in the American Dental Association and components, International Associa-

tion for Dental Research (Member of Council 1960-), American Academy of Pathology, and the American Cancer Society (Richmond Chapter and Virginia Division).

Dr. Salley has contributed eight articles to the dental literature and has collaborated in the writing of eight others. The majority of them appeared in the **Journal of Dental Research**, the **Journal of the American Dental Association** and **Oral Surgery, Oral Medicine, Oral Pathology**.

The new Dean will assume his duties at Maryland on July 1. He will have the distinction of being the first Dean of a Maryland dental school who received the D.D.S. degree from a school outside the state.

The student body, the faculty and the alumni join in expressing the hope that Dr. Salley will have a long, pleasant, and successful period of service as Dean of the world's first dental college.

## SONS OF DENTISTS IN FRESHMAN CLASS

There are three sons of alumni in the Freshman Class (1966): Michael Allan Baylin, son of George J. Baylin '36, of Baltimore; Bruce Tryon Rogers, son of Everett T. Rogers '39, of Naugatuck, Conn. '39 (residence in Middlebury); and Joel Hillel Wien, son of Robert Wien '36, of Pompton Lakes, N. J.

Three members of the Class of 1966 are sons of graduates of other dental schools: Paul Mario Bellanca, of Wilmington, Del., son of Leonard Bellanca, a 1929 graduate of the University of California College of Dentistry; Alfred John Coletti, of Pawtucket, R. I., son of Alfred Coletti (practice in Providence), a 1934 graduate of the Tufts College Dental School; and Frank Paul Merolla, of White Plains, N. Y., son of Frank Merolla, a 1933 graduate of the University of Pennsylvania School of Dentistry.



## DR. PRIDGEON, NEW DEPARTMENT HEAD

In September, 1962 Dr. Charles Taylor Pridgeon '35 returned to his alma mater as a member of the faculty with the designation of Associate Professor, Head of the Department of Oral Medicine.

Dr. Pridgeon was born in Baltimore on April 3, 1911. He obtained his pre-dental training at Loyola College. In the School of Dentistry he achieved memberships in the Gorgas Odontological Society and Omicron Kappa Upsilon.

Following his graduation, he interned at the Baltimore City Hospital. After a year of senior internship at the U. S. Marine Hospital in Baltimore he received a commission as First Lieutenant in the U. S. Navy Dental Corps. He was commissioned as a Captain in 1951 and retired in 1962, after 25 years in the service. His service record includes these assignments: U. S. Naval Academy, 1937-8; U.S.S. Charleston, 1938-40; Marine Barracks, Quantico, 1940-2; U.S.S. Indiana, 1942-3; Sampson NTC, 1943-5; Seventh Fleet Dental Officer, 1946-7; Patuxent Naval Air Station, 1948-52; U.S.S. Consolation (Chief of Dental Service), 1952-3; Naval Dental Clinic (Executive Officer), Washington, D. C., 1953-6;

Graduate School of Medicine, University of Pennsylvania, 1956-7; Naval Forces Mediterranean and Eastern Atlantic (Staff Dental Officer for Commander-in-Chief), London, 1957-59; and Camp Lejuene (Base Dental Officer), 1959-62.

Dr. Pridgeon is a Fellow of the American College of Dentists (1953) and a member of the American Academy of Periodontology. He has published many articles on periodontics and preventive dentistry and has presented several papers before civilian and military groups. Since 1948 he has practiced the specialty of periodontics.

Dr. Pridgeon took postgraduate courses at Temple University, 1953; University of Pennsylvania, 1948; Mayo Clinic, 1942; and Beth Israel Hospital, 1954. His graduate work was accomplished at the University of Pennsylvania School of Medicine, 1956-57, in periodontology.

Dr. Pridgeon married the former Dorothy Elizabeth Killman. They have two children: Charles T. Jr., 24, who is doing graduate work in English at Duke University; and Sandra, 18, who is a freshman at College Park.



## "AN EVENING OF RESEARCH"

On April 1 the Baltimore Chapter of the International Association for Dental Research sponsored a program designed to give members of the various departments of the School an opportunity to present reports on their research before the Chapter's membership. The listing includes designations of the contributor, department and subject:

George W. Piavis (Anatomy): The Effect of Temperature Fluctuations and Selective Larvicides on the Sea Lamprey (*Petromyzon marinus*) with Comments on Regeneration.

Charles B. Leonard, Jr. (Biochemistry): Amino Acid Incorporation into Rat Liver Ribosomes. Martin H. Morris (Biochemistry): The Synthesis and Characterization of Basic 3-Indolyl Esters and Ethers with Possible Pharmacodynamic Activity

Gardner P. H. Foley (Dental Literature): Civil War Dentistry

Sue-ning C. Barry (Histology and Embryology): Carbohydrate Metabolism of *Streptococcus salivarius*

José H. Diaz (Operative): A Com-

prehensive Study of the Physical Properties of Elastomeric Impression Materials with Emphasis upon Factors Affecting Clinical Success. Francis A. Veltre (Operative): Clinical Studies to Determine the Bacterial Contamination of the Operator from High Speed Instruments

Alvin F. Gardner (Pathology): Anorganic Bone in the Repair of Oral and Maxillofacial Wounds

Leah M. Staling (Physiology): An Electromyographic Analysis of the Muscles Controlling the Temporomandibular Joint. Jerome D. Buxbaum (Physiology): The Relationship of These Data to Clinical Problems

Wilbur O. Ramsey (Prosthetics): Investigation of Vertical Facial Dimension

H. Berton McCauley (Public Health Dentistry): Survey of the Status of Dental Caries and Dental Care Needs in Baltimore City

Rodney F. Smith (Microbiology): Antimicrobial Studies of a Group of Nitrogen-Containing Steroids.

## JONES '62 WINS BREMNER AWARD

The third M.D.K. Bremner Award Contest sponsored by the American Academy of the History of Dentistry was won by Laddie L. Jones, of Simpsonville, S. C., a member of Maryland's Class of 1962. The contest is open to the seniors of all the dental schools of this country and Canada. The subject of Jones' thesis is "Alumni of the Baltimore Dental Schools Who Served in the Civil War." Dr. Jones is presently stationed at the Keesler Air Force Base in Biloxi, Miss. He is the second Maryland senior to win the Award, Dr. Rolla R. Burk, Jr., having won the first contest in 1960.



## FROM THE RANKS OF THE FILE

The number of our graduates who have served in their state legislatures has been increased to 17, representing 11 states. The recent additions are David Alan Abrams '44 and Woodrow Wilson Corder '42, members of the West Virginia legislature. Dr. Abrams, who upon graduation entered the family business in Beckley, is serving his second term in the House of Delegates. Dr. Corder, of Buckhannon, took office on January 9 as the only delegate from Upshur County and the first Democrat to be elected to the House from that county since 1881. At 270 he is the largest member of the House. It is a noteworthy fact that there are 4 dentists among the 100 members.

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It is always important and interesting to recognize the contributions of our alumni in non-professional fields. These men are generally referred to in dental literature as "truants" because of their accomplishments outside the activities of the dental profession. The particular concern of this note is the alumni who have contributed **books** to the general literature. The **Alumni File** reveals that four of our graduates have earned membership in this classification of "truants."

Joseph Smith Dodge '58 received his A.B. and A.M. degrees from Columbia College and his M.D. degree from the College of Physicians and Surgeons (New York). In 1892 Tufts College awarded him the S.T.D. (Doctor of Sacred Theology) degree in recognition of his long career as a lay preacher of the Universalist Church. In 1876 Dr. Norman Kingsley paid tribute to Dr. Dodge as a

dentist "who added to the highest dental proficiency a thorough knowledge of medicine." An eloquent speaker and able writer, Dr. Dodge achieved wide recognition for his book **The Purpose of God**. In 1856 he was elected to the Board of Trustees of the New York College of Dentistry and in the same year was appointed to the chair of Dental Pathology and Therapeutics, in which he served till 1892. Dr. Dodge died in Stamford, Conn., on April 13, 1921.

James B. Hodgkin '69 was a very valuable member of the dental profession. His coming to the B.C.D.S. was delayed by several years because of the Civil War and its aftermath impact on the South. Hodgkin served throughout the War in Company E, Third Regiment of Virginia Infantry, Pickett's Division. He was a member of the faculty of his alma mater from 1872 to 1888 as Professor of Mechanical Dentistry and Metallurgy and as Professor of Pathology and Therapeutics. He later held professorships at the National University School of Dentistry and the Dental Department of Howard University. Dr. Hodgkin was Associate Editor of both the **American Journal of Dental Science** and the **Southern Dental Journal** and contributed many articles to the literature. Before the War he had worked in a newspaper office in Alexandria and continued to exercise a penchant for writing during his professional career. A frequent contributor to the **Atlantic Monthly**, he published a book titled **Southland Stories**. Dr. Hodgkin died on April 10, 1916.

William Henry Richards '78 (B.C.D.S.), of Knoxville, Tenn., was too young to enlist in the Confederate



Army but was adopted as a mascot by Company E, Eighth Virginia Infantry, Pickett's Division. Lucy A. D. Tipton wrote a poem about his exploits that may be found in many anthologies of Southland poetry. Dr. Richards was President of the Tennessee State Dental Association (1894-95) and President of the Southern Dental Association (1896-97), presiding over the last meeting of the S.D.A. prior to its amalgamation with the A.D.A. A collection of his poetical efforts was published under the unusual title of **Poems and Poems**. Dr. Richards died in 1939.

In March of this year Norman Dale Kisamore '56, of Essex, Md., joined the small group of alumni writers of non-professional books. Dr. Kisamore's **A Primer for Eastern Racing** was published by Dodd, Mead. Whitney Tower, Turf Editor of **Sports Illustrated**, has recommended it: "You have done a most thorough job of research and your readers will certainly get their money's worth." The publisher's blurb contains these items of information about the Kisamore "turf classic": . . . a cleverly written, humorous account of the sport of thoroughbred running races in the Eastern half of the United States. . . . The book discusses thoroughly the horses, jockeys, race tracks, races, major and minor league racing, the racing papers, handicapping and betting—and does it in such a way that you will learn to look upon racing as a sport, and not as a sin." Before entering the University of Maryland in 1950 for his pre dental course Dr. Kisamore served for three years as a technician in the Navy Dental Corps. Following his departure from Lombard and Greene, he

interned at the Spring Grove Mental Hospital. In 1957 he began practice in Essex. As an undergraduate Dr. Kisamore was known as "the Will Rogers of the Dental School"; his favorite freshman saying was "Tonight I'm going to study histo, bio and Pimlico." Apparently he has greatly extended his Pimlico study.

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There is an addition to be made to the formerly reported number of 21 alumni who have been elected to the office of mayor. Gordon H. Claude '82, who died in 1940, served as mayor of Annapolis, Md., 1907-1909. Dr. Claude was a colorful and important figure in the affairs of Maryland's capital.

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Jacob Zollinger Hoffer, of the B.C.D.S. Class of 1869, is the only alumnus known to have served in the War with Mexico. Dr. Hoffer may very well have achieved the unique distinction of being the only graduate dentist to participate in that War. He was born in Carlisle, Pa., on April 7, 1826, where he was a tailor prior to his enlistment. On December 24, 1846, at Greensburgh, Pa., he was enrolled as a private in Company I, Second Regiment of Pennsylvania Volunteers. He was mustered into the service of the United States at Pittsburgh on January 1, 1847, to serve "during the war with Mexico." His official record indicates that he served under General Winfield Scott and participated in the important battles of Veracruz, Cerro Gordo, Chapultepec and City Gates, the last resulting in the capture of the City of Mexico and the end of the campaign. Hoffer received a medical discharge at San



Angel, Mexico, April 11, 1848, "by reason of the Surgeons Certificate of Disability." He was honorably discharged from the service at Pittsburgh, Pa., on July 14, 1848, and returned to Carlisle, where he remained for eight years. After a three-year period in Harrisburg, he removed to Columbia, Pa., where he spent the next forty-three years and where he died on March 22, 1901, at the age of seventy-four. In 1855 he began the study of dentistry under the preceptorship of Dr. George Washington Neidich (B.C.D.S. 1856), of Carlisle, and in 1858 commenced his long career of practice in Columbia. His attendance at the B.C.D.S. after several years of practice and his graduation at the age of forty-three were not unusual circumstances for that period. Both Dr. Hoffer and Dr. Neidich were charter members of the Pennsylvania State Dental Society (1868). Dr. Hoffer was survived by his wife, Sarah Graves Hoffer, and by a son and four daughters.

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The File indicates that only one alumnus has been elected to the office of State Commander of the American Legion — Phra E. Kercheval '21 (B.C.D.S.), of Kingwood, W. Va.

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In 1918 Henry Sibley Colding (B.C.D.S. '86) participated in a dramatic episode that required him to change his identity from practicing dentist to assistant engineer of a ship—on an hour's notice. Before entering the B.C.D.S. Dr. Colding had served 11 years as an apprentice ma-

chinist and as an engineer; his training qualified him for the license of chief engineer for ocean steamships. Thus it was that in answer to an emergency call during World War I he returned to his former vocation and served as assistant engineer on the **City of St. Louis** on a trip from Savannah, Ga., to New York and return. Dr. Colding practiced in Savannah 1886-1907 and 1914-25, practicing in New York 1907-14. For several years he was Commander of the Naval Battalion of Georgia. He was a leading figure in Georgia dentistry and served as President of the Georgia State Dental Society in 1896. Dr. Colding died October 16, 1925, at 69.

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Joseph John Battle '91 (B.C.D.S.) achieved an unusual distinction for a dentist—Chief of the Fire Department. He also served on the Board of Aldermen of Rocky Mount, N. C. and was the first President of the Rocky Mount Dental Society. He entered the B.C.D.S. as the beneficiary student from North Carolina. Dr. Battle died on January 7, 1924.

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Thomas Sidney Wilson '19 (U. of Md.) is probably the only dentist who has served as President of a professional baseball league. Dr. Wilson was President of the Bi-State League and of the Carolina League. He was also President of the Rockingham County Horse Show Association and the first President of the Rotary Club of Draper, N. C. Dr. Wilson died on March 27, 1949.

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Norman J. Roberts '82 (B.C.D.S.) is one of the distinguished group of our alumni who have served with distinction on the faculties of other dental colleges. A native of Chicago, he practiced in Waukegan, Ill., from the year of his graduation till his death in 1940. Dr. Roberts was Professor of Oral Surgery at the Northwestern College of Dental Surgery. Later he became Professor of Orthodontia and Anesthetics at the Chicago College of Dental Surgery. He was President of the Lake County Dental Society in 1905. A beneficiary student recommended by his State Society, Dr. Roberts was an exemplary scholarship recipient.

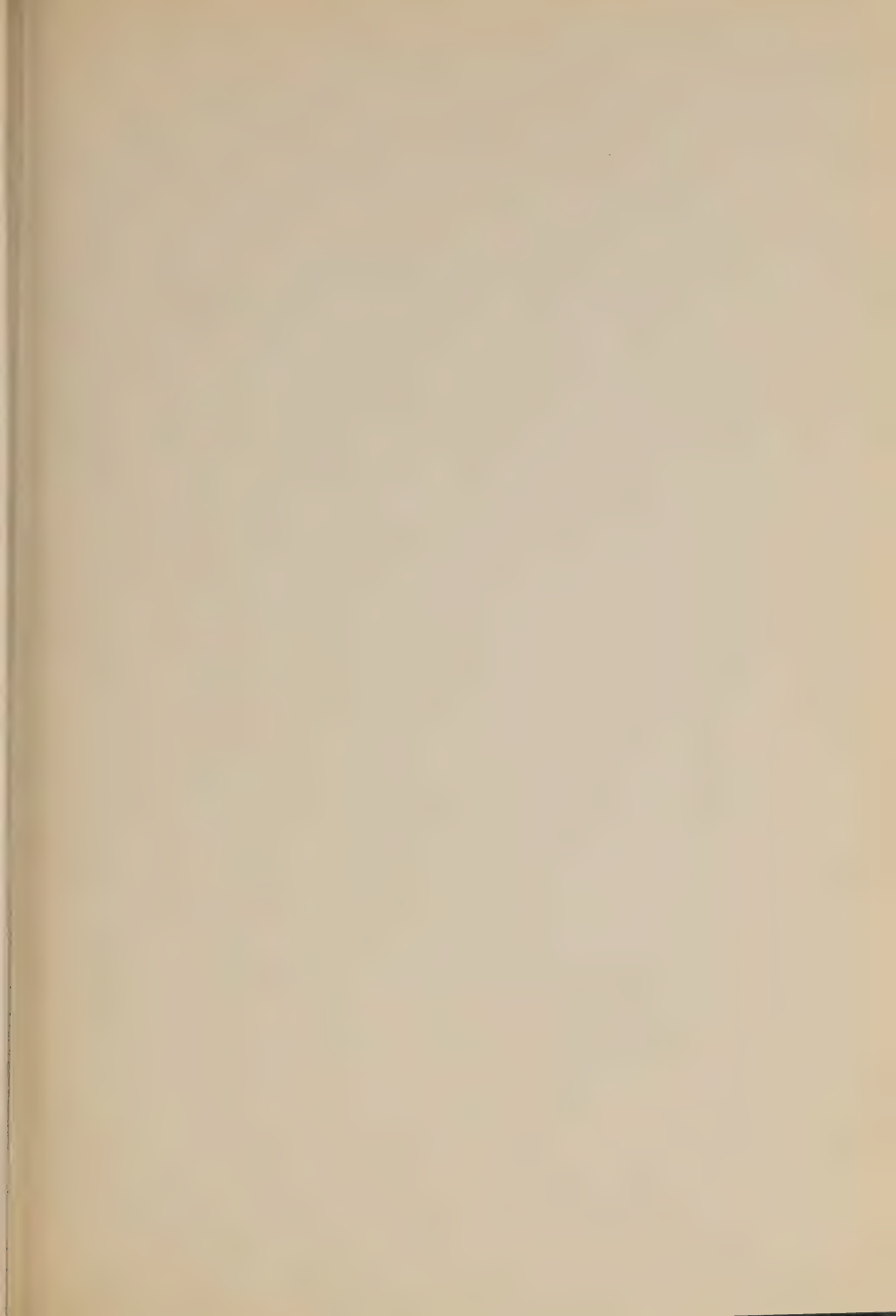
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Two alumni achieved very impressive records as leaders in Colorado dentistry. Reuben Bossart Weiser '68 (B.C.D.S.) came to Baltimore from Illinois. After graduation he went to Georgetown, Colorado. In 1884 he removed to Denver, where he practiced till his retirement in 1914. He died in 1922. Dr. Weiser was

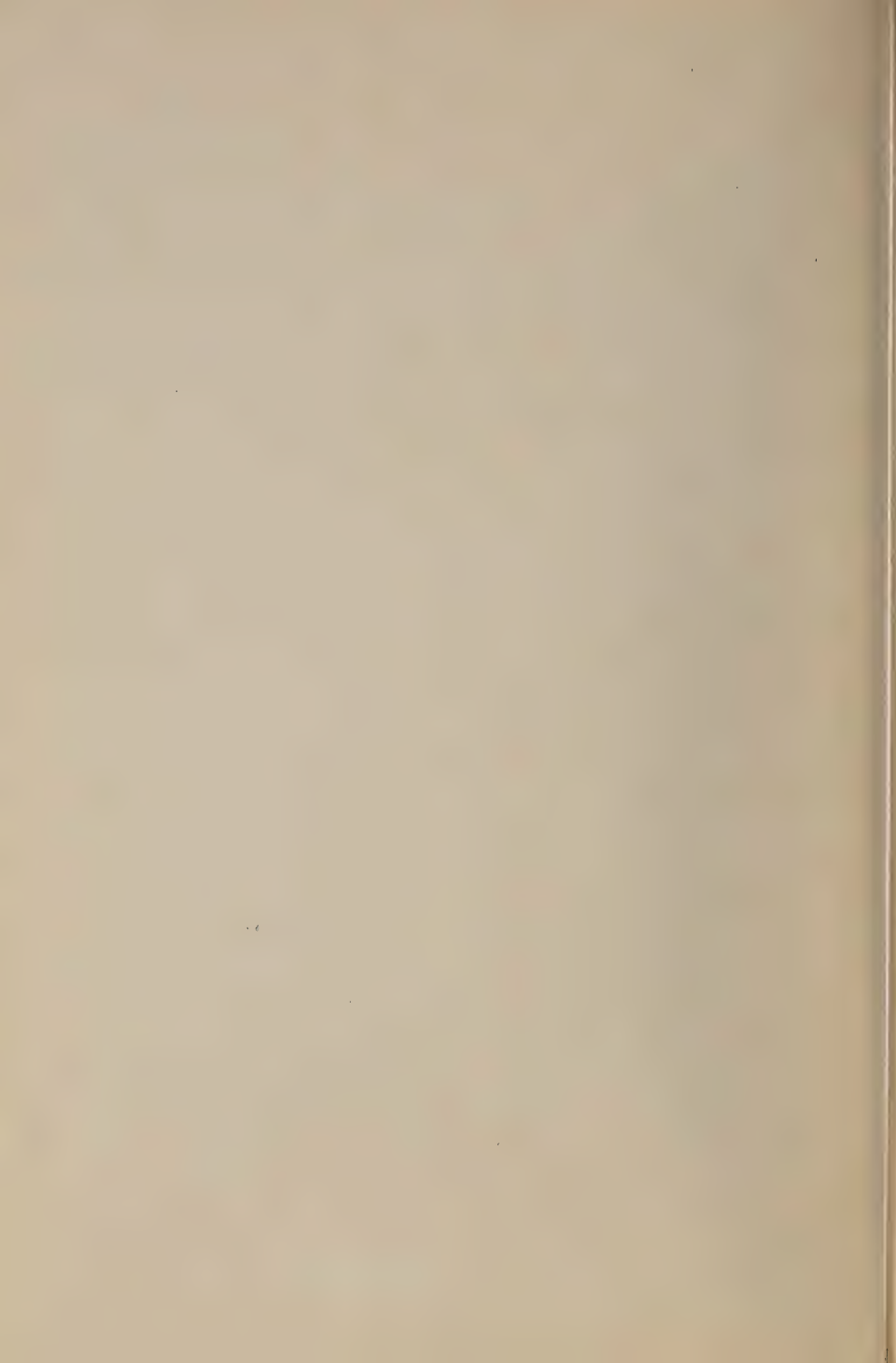
primarily responsible for securing the passage of the first Colorado dental law. He was a member of the State Senate. He was Dean of the Denver Dental School, 1894-96, and held the chair of Prosthetic Dentistry and Metallurgy. He was President of the Colorado State Dental Association (1891) and of the Denver Dental Club (1894-96). Another important facet of his contribution was his membership on the State Board of Dental Examiners, 1893-97.

John Marshall Norman '71 (B.C.D.S.), a native of Tennessee, was a drummer boy in the Confederate Army. After graduation he practiced in Trenton, Tenn., but in 1873 removed to Denver, Colorado, where he practiced till three weeks before his death in 1934, at 85. Dr. Norman was President of the first Colorado Board of Dental Examiners, 1889-91, and was also President of the State Dental Association (1892). He was an excellent operator with gold foil and amalgam and presented many papers and clinics. Dr. Norman was Grand Secretary of the I.O.O.F.











MAY 25 1964

CIRCULATES AFTER ~~STACKS~~ JUN 22 1964

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**BALTIMORE COLLEGE OF DENTAL SURGERY  
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## **TENTATIVE COMMENCEMENT PROGRAM**

### **WEDNESDAY, JUNE THIRD**

6:00 p.m.—Caswell Room, Lord Baltimore Hotel

#### **OMICRON KAPPA UPSILON (PHI CHAPTER)**

Banquet and Convocation

### **THURSDAY, JUNE FOURTH**

Student Union Building—Baltimore Campus

8:00 a.m.—Past Presidents Breakfast

8:45 a.m.—Registration of Alumni

9:00 a.m.—Meeting of the Board of Trustees

10:00 a.m.—Annual Business Meeting of Alumni Association

12:00 noon—Golf Tournament

Rolling Road Golf Club, Catonsville, Maryland

#### **REUNIONS FOR CLASSES OF**

|      |      |
|------|------|
| 1914 | 1939 |
| 1919 | 1944 |
| 1924 | 1949 |
| 1929 | 1954 |
| 1934 | 1959 |

### **FRIDAY, JUNE FIFTH**

9:30 a.m.—Health Sciences Library Auditorium  
Academic and Awards Program

12:00 noon—Student Union Building  
Luncheon

1:00 p.m.—Open House—Dental School  
(Displays in Departments)

6:00 p.m.—Sheraton-Belvedere Hotel  
Cocktails

7:30 p.m.—Dinner

10:00 p.m.—Dancing

### **SATURDAY, JUNE SIXTH**

Morning Graduation Exercises—College Park, Maryland



## A MESSAGE FROM DEAN SALLEY

It is almost inconceivable that time should have passed by so rapidly and that June Week for 1964 will be with us in a little over a month from now.

All of us on the Faculty sincerely hope that each and every alumnus will find it possible to join us in honoring the Class of 1964 as they reach the first plateau of their careers in the profession. We shall also pay homage to the five-year reunion classes as they return to their Alma Mater to receive well-earned congratulations from both the School and their fellow Alumni. Space does not permit me to list all of these illustrious groups but I would like to single out our 50-year honorees—the classes of 1914 of the University of Maryland and the Baltimore College of Dental Surgery. One member of the former group is due special mention—J. Ben Robinson. Dean Robinson has recently favored us with the gift of his many diplomas and honors recognizing his half century of dedicated service to dentistry. I know you will agree with me that we are privileged to have this material as part of our already valuable and irreplaceable collection of dental memorabilia.

When you do join us for June Week, we hope that all will attend the Precommencement Exercises on Friday morning, June 5, in the auditorium of the Health Sciences Library. Our speaker will be the Right Reverend Noble C. Powell, who recently retired as Bishop of the Episcopal Diocese of Maryland. Many of you have had the privilege of knowing Bishop Powell over a long period of time, and while I cannot be counted among this fortunate group, my short exposure to him and the dynamic personality he possesses convinces me that his words will be not only timely but meaningful to graduates, alumni and faculty alike.

The granting of degrees to our graduates will take place in Cole Field House at College Park Campus on the following morning, Saturday, June 6. Dental Alumni are cordially invited to attend this final affair of June Week and extend the warm hand of comradeship to our newest colleagues.



## FACULTY ACTIVITIES

(This is a report on the varied activities of the faculty members during 1963.)

Dr. John J. Salley, Dean, made visits to a number of groups to discuss the planning for the expanded program of dental education at the University: semi-annual session (Ocean City) of the Maryland State Dental Association and the Association's Committee on the New Dental Building; Baltimore City Dental Society; Baltimore County Dental Association; Sigma Epsilon Delta Alumni Chapter (Baltimore); New Jersey Section of Dental Alumni (Newark); Rhode Island Section of Dental Alumni (Providence); and Gorgas Odontological Society. Dr. Salley presented lectures in oral pathology and related subjects before several groups: Armed Forces Institute of Pathology (Washington); Psi Omega Fraternity; U. S. Army Institute of Dental Research (Washington); Richmond (Va.) Dental Society; Medical College of Virginia School of Dentistry; U.S.P.H.S. Hospital Medical Staff (Baltimore); V. A. Regional Office Medical Staff (Baltimore). Besides these activities Dean Salley attended and participated in these meetings and conferences: National Board of Dental Examiners of the A.D.A. (Chicago); Annual Conference of Dental School Deans (Las Vegas); Dental Study Section Meetings at National Institutes of Health (Bethesda); American Academy of Gold Foil Operators (Baltimore); American College of Dentists and A.D.A. (Atlantic City); Southern Maryland Dental Society (Washington); American Association of

Dental Examiners Workshop (Chicago).

Dr. José E. Medina, Professor of Operative Dentistry and Assistant Dean, presented papers before a number of organizations: January 22, "Class III Restorations," Rhode Island State Dental Society (Providence); February 8, "Amalgam Restorations," Walter Reed Army Medical Center (Washington); February 12, "Recent Developments in Restorative Materials, with Emphasis on Factors Influencing Clinical Success," Eastern Shore Dental Society (Cambridge, Md.); April 11, 18 and 25, "Principles of Operative Dentistry," Maryland State Dental Assistants Association (Baltimore); October 31, "Recent Developments in Operative Dentistry," New York Chapter, Academy of General Dentistry (Brooklyn); November 15-16, "Operative Dentistry," Davis Research Study Club (Boston); December 16-17, "Recent Developments in Operative Dentistry," Nassau County Professional Budget Plan Study Group (Long Island, N.Y.). Dr. Medina presented several other papers that were supplemented by clinical demonstrations: March 2-3, "Class V Preparations," Central Florida Gold Foil Study Group (Orlando); April 6-7, "Operative Dentistry," Joint Meeting of New York Study Clubs (Tarrytown); April 20-21, "Class III Restorations," George M. Hollenback Operative Dentistry Seminar (Huntington, W. Va.); May 16-17, "Class III and V Restorations," New England Study Club of Dentistry (Providence); May 27, "Class V Restorations," Walter Reed Army Medical



Center; September 14-15, "Class III Restorations," Central Florida Gold Foil Study Club (Orlando); September 28-29, "Class III Restorations," George M. Hollenback Operative Dentistry Seminar (Huntington, W. Va.); December 2-4, "Comparative Evaluation of Elastic Impression Materials," Greater New York Dental Meeting; December 13-15, "Class III and V Restorations," New England Study Club of Dentistry (Newport, R. I.). Before the Federación Odontológica y Panamá, San Salvador, El Salvador, Central America, May 7-10, Dr. Medina presented papers and table Clinics on "Use of High Speed," "Use of Mat Gold," "Acrylics in Dentistry," and "Elastomeric Materials." He also gave a postgraduate course, with papers and clinical demonstrations, on "Operative Dentistry" before the Lake County Dental Society (Eustis, Fla.), October 25-27. Dr. Medina served as chairman, General Arrangements Committee for the 1963 meeting of the Maryland State Dental Association; is President-Elect of the American Academy of Gold Foil Operators, Secretary-Treasurer of the Baltimore Chapter, I.A.D.R. and President of the Sunnybrook Community Association. He is a member of the University Committee on Excellence in Teaching.

Dr. Calvin J. Gaver, Associate Professor of Operative Dentistry, presented two papers: February 9, "Treatment of Mutilated Posterior Deciduous and Adult Dentition," Greenbriar Valley Dental Society (White Sulphur Springs, W. Va.); October 8, "Pin Retention for Badly Mutilated Posterior Teeth," Frederick County (Md.) Dental Society. Dr.

Gaver attended a course on "Functional Occlusion" presented by the J. F. Jelenko Co. in New York, July 15-17; and the Conference on Dental Materials, held at Northwestern University (Chicago), November 21-22. He is President-Elect of the Alumni Association, Baltimore College of Dental Surgery, Dental School, University of Maryland; and Treasurer of the Maryland Section, International College of Dentists.

Dr. Edmond G. Vanden Bosche, Assistant Professor of Tooth Morphology, gave two lectures on "Dental Anatomy" to the Maryland State Dental Assistants (Baltimore), May 28 and April 5. On November 20 he presented, in collaboration with Dr. Diaz, a television clinic on "Elastic Impression Materials" to the Baltimore City Dental Society.

Dr. Francis A. Veltre, Assistant Professor of Operative Dentistry, attended a course on "Pathology of the Oral Regions" at the U. S. Army Institute of Dental Research (Washington), March 11-15. Dr. Veltre gave four lectures on Bacteriology (May 2, 7, 14 and 21) and presented a paper on "Role of Bacteriology to the Dental Assistant" (November 11) before the Maryland State Dental Assistants Association.

Dr. William J. Bowen, Instructor in Operative Dentistry, in collaboration with Dr. Mastrola, presented a table clinic on "Pin Retention for Amalgam Restorations" at the January 29 meeting of the Baltimore County (Md.) Dental Association.

Dr. Frank W. Mastrola, Instructor in Operative Dentistry, in collaboration with Dr. Bowen, presented a table clinic on "Pin Retention for Amalgam Restorations" before the



Baltimore County Dental Association meeting of January 29. On August 9 Dr. Mastrola attended a course on "Modern Concepts of Exodontia at Fort Leonard Wood, Missouri.

Dr. Ernest B. Nuttall, Professor of Fixed Partial Prosthodontics, published two articles: "Establishing Posterior Functional Occlusion for Fixed Partial Dentures" in the *Journal of the American Dental Association* (March) and "The Principles of Obtaining Occlusion in Occlusal Rehabilitation" in *Journal of Prosthetic Dentistry* (July-August). He presented four lectures on "Crown and Bridge Prosthodontics" to a postgraduate class at the United States Army Institute of Dental Research (Washington), January 30; and lectured to the Dental Service Staff of the United States Public Health Service Hospital in Baltimore, December 4 and 11. Before the Washington County (Md.) Dental Society (Hagerstown) he gave a paper on "Conservative Retainers in Fixed Prosthodontics," November 19. In September Dr. Nuttall visited South America, where he engaged in these activities: September 15-21, presented a one-week postgraduate course on "Crown and Bridge Prosthodontics" before sixty dentists at the Universidad de Buenos Aires (Argentina); September 23-25, appeared on the program of the XIV Jornados Internacionales de la Asociacion Odontologica Argentina—presenting a television demonstration on "Present Concepts in Fixed Partial Prosthodontics" and participating in a round-table discussion on "Oral Rehabilitation"; September 27, lectured to the junior and senior classes of the Faculdade de Odontologia de Uni-

versidade do Rio Grande do Sul (Brazil) on "Dental Education in the United States." At the annual meeting of the American Association of Dental Schools, at Pittsburgh (March 25), he was the moderator of the Conference Session on Fixed Prosthodontics. At the meeting of the American Dental Association (Atlantic City) Dr. Nuttall, Vice-Chairman, presided over the program of the Section on Partial Prosthodontics. Dr. Nuttall was appointed Area Consultant in General Dentistry by the Veterans Administration Area Medical Office, Trenton, N. J.; he is the Chairman of the Partial Prosthodontics Section of the American Dental Association; he is a member of the Committee on Health and Medical Services of the State of Maryland Commission on the Aging; and is Chairman of the Reference Committee on the President's Report and Administrative Matters (M.S.D.A.). Dr. Nutall attended a postgraduate course on "A Surgical Look at the Anatomy of the Head and Neck" given at the School, November 7, 14 and 21.

Dr. Stanley H. Dosh, Associate Professor, Dr. Peter M. Lu, Associate Professor, and Dr. Henry J. Bianco, Jr., Assistant Professor—all of the department of Fixed Partial Prosthodontics—attended the all-day Seminar on Occlusion held at the National Institutes of Health (Bethesda), September 19, and a postgraduate course on "A Surgical Look at the Anatomy of the Head and Neck" given at the School, November 7, 14 and 21. Dr. Bianco also attended a course on "Functional Occlusion" presented by the J. F. Jelenko Co. in New York, July 15-17. At the session of the



American Academy of Gold Foil Operators, held at the School in October, Dr. Bianco presented a paper on "The Effect Gold Foil Techniques Have on Pulpal Tissues" and a chair clinic on "Class V Gold Foil—Gold-Dent Restoration." He was elected in June to faculty membership in Omicron Kappa Upsilon and in August was awarded the M.S. degree by the University of Maryland. Dr. Bianco is Deputy Supreme President of Eta Chapter, Xi Psi Phi Fraternity.

Dr. Donald E. Shay, Professor of Microbiology, published three collaborative papers: "Incidence of Coagulase-Positive Staphylococci in the Upper Respiratory Tract of Dental Students and a Study of Their Transmission during a Routine Dental Prophylaxis" (with G. C. Clendenin), in the *Journal of Dental Research* (January); "Antimicrobial Action of Nitrogen-Containing Steroids" (with R. F. Smith and N. J. Doorenbos), in the *Journal of Bacteriology* (June); "Effects of Protein, Lipids and Surfactants on the Antimicrobial Activity of Synthetic Steroids" (with Smith and Doorenbos), in *Applied Microbiology* (June). Dr. Shay is chairman of the Awards Committee of the Maryland Branch, American Society for Microbiology and of the Membership Committee of the Society. He is a member of the Anne Arundel County Science Seminar Advisory Committee and of the American Public Health Association's Examination Service Committee. Dr. Shay is a Diplomate of the American Board of Microbiology, with certification in Public Health and Medical Laboratory Bacteriology.

Dr. Wilbur O. Ramsey, Professor of Prosthodontics, presented three papers: "The Mandibular Partial Denture," Washington County Dental Society (Hagerstown); "Partial Dentures—The Problem of Stress Distribution," Frederick County Dental Society (Frederick); "Stabilization of the Distal Extension Partial Denture," Wilmington (Del.) Dental Society. Dr. Ramsey is Consultant to the Fort Howard (Md.) Veterans Administration Hospital and to the U.S.P.H.S. Hospital in Baltimore.

Dr. Ralph J. Gordon, Instructor in Prosthodontics, was appointed Chief of Prosthodontics, Out-Patient Dental Department of Sinai Hospital. Dr. Gordon presented three clinics: "Full-Denture Prosthodontics," Postgraduate Clinic of the District of Columbia Dental Society; "Occlusion in Full-Denture Prosthodontics," Maryland State Dental Association (May) and the American Dental Association (October). In May he gave a postgraduate course in "A Method for Complete Denture Construction," sponsored by the Baltimore City Dental Society.

Dr. Marvin M. Graham, Assistant Professor of Fixed Partial Prosthodontics, presented a paper on "Functional Analysis of the Temporomandibular Joint" before the Baltimore Alumni Chapter of the Alpha Omega Fraternity. Dr. Graham received two appointments at Sinai Hospital (Baltimore): Director of the Dental Clinics and Chief of the Out-Patient Department Dental Service, and Director of the Temporomandibular Joint Clinic. He was elected President of the Baltimore Alumni Chapter of Alpha Omega and of the Franklin Senior High P.T.A.



Dr. Samuel H. Bryant, Assistant Professor of Oral Diagnosis, completed his term as President of the Phi Chapter of Omicron Kappa Upsilon and began his term as President of the Maryland State Dental Association. Dr. Bryant was a Delegate to the A.D.A. meeting in Atlantic City. He is Treasurer of the newly formed Maryland Dental Service Corporation.

Dr. Philip Smith, Assistant Professor of Oral Diagnosis, presented a paper on "Oral Diagnosis" before the March meeting of the Washington County Dental Society (Hagerstown).

Dr. Louis Weiss, Instructor in Roentgenology, presented a clinic on "X-ray Examination of the Teeth," at the October meeting of the Eastern Shore (Md.) Dental Society.

Dr. John I. White, Professor of Physiology, was the author of one published paper and a collaborating author of another: "Studies on Some Effects of Ryanodine on Glycerol-Extracted Muscle," in U. S. Army Research and Development Laboratories Special Publication 2-53 *Proceedings of Conference on Studies on Extractives of the Plant Genus Ryama*; (with B. Sacktor and E. Wormser-Shavit) "In Situ Changes in Extra-mitochondrial NAD Redox Metabolites During Muscular Contraction," abstracted in *Federation Abstracts*, Volume 22.

Dr. Burton R. Pollack, Associate Professor in Physiology, was appointed as Lecturer by the Johns Hopkins School of Hygiene and Public Health, Department of Maternal and Child Health. Dr. Pollack published four papers: "The Dental Treatment Center for the Handicapped," *Mercer*

*Dental Society (N.J.) Journal* (February); "Dental Center Treatment of Handicapped Children," *Public Health Reports* (February); "Determining Mouth Odor with the Osmoscope," *Dental Progress* (April); "A Study of Reports of Services for a Dental Treatment Center for Handicapped Children," *American Journal of Public Health* (October). Dr. Pollack presented a paper on "Dental Care of the Handicapped" before five dental organizations and spoke on "Dental Problems of Your Handicapped Children" to eight parent and P.T.A. groups.

Dr. Charles T. Pridgeon, Associate Professor in Oral Medicine, was elected President of the Baltimore Society of Periodontology. Dr. Pridgeon presented two papers: "Periodontics for the General Practitioner", January meeting of the Baltimore County Dental Society; "Altered Passive Eruption Related to Periodontal Disease," annual meeting of the Maryland State Dental Association. He gave a lecture on "Periodontics and Oral Hygiene for the Dental Assistant," December meeting of the Maryland State Dental Assistants Association.

Dr. Barry S. Lever, Assistant Professor of Oral Medicine, presented a paper on "The Early Recognition and Treatment of Periodontal Disease" at the March meeting of the Lycoming County (Pa.) Dental Society. On March 9 Dr. Lever presented a TV demonstration on "The Principles and Use of the Cavitron," Postgraduate Course for Hygienists at the University of Pennsylvania. Before the Baltimore City Dental Society, November 20, he gave a TV demon-



stration of "The Surgical Procedure—Gingivectomy."

Dr. Douglas J. Sanders, Professor of Pedodontics, presented a paper on "The Parallel Pin Castings for the Fractured Anterior Teeth in Children" before the Eastern Shore Dental Society (Cambridge). Dr. Sanders is Secretary-Treasurer and a member of the Executive Council of the Maryland Society of Dentistry for Children, and a member of the Board of Governors, Serra Club of Maryland. He received these appointments: member of Advisory Council on Preventive Medicine for the State of Maryland; pedodontic consultant, National Association on Standard Medical Vocabulary; Program Chairman, Maryland State Dental Association; staff member, St. Agnes Hospital. In October Dr. Sanders participated in the trainee course given at the Lancaster, Pa. Cleft-palate Clinic under the sponsorship of the National Institutes of Health.

Dr. Francis J. Kihn, Instructor in Pedodontics, attended a Workshop Conference on Dental Assistant Training Programs held in Chicago in April.

Dr. Joseph J. Giardina, Instructor in Pedodontics, presented a clinic on "Formocresol Pulpotomy Technique and Utilization of Stainless Steel Crowns in Pedodontics" at the February meeting of the Maryland Society of Dentistry for Children. Dr. Giardina is President-Elect of the Society and a member of its Executive Council; he is also a member of the Law Infracture Committee, Baltimore County Dental Society.

Dr. Edward C. Dobbs, Professor of Pharmacology and Therapeutics, contributed an article on "Drugs

Which Act on the Skin and Mucous Membranes" to *Dental Clinics of North America*. He was a collaborating author of two other articles: "A Clinical Evaluation of Trimethobenzamine (Tigan) as an Antigagging Drug" (with L. E. Grace and R. D. Hackney), *Oral Surgery, Oral Medicine, Oral Pathology* (April) and "Mepivacaine HCl (Carbocaine) without Vasoconstrictor" (with N. M. Ross), *Journal of Oral Surgery, Anesthesiology and Hospital Dental Service*. Dr. Dobbs appeared on the programs of the Richmond County Dental Association (Columbia, S.C.—March) and the Middle Atlantic Society of Oral Surgeons (Baltimore—November).

Dr. Norton M. Ross, Associate Professor of Pharmacology, was moderator of a symposium on "Problems in Special Education," Greenspring Valley Synagogue, March 29. He presented a clinic on "Present Status of Antibiotic Therapy in Dentistry," at the November meeting of the Western Shore (Md.) Dental Society. Dr. Ross is President of the Maryland and District of Columbia Section of the American Academy of Dental Medicine.

Dr. D. Vincent Provenza, Professor of Histology and Embryology, returned in June from his year of sabbatical leave at the National Institute of Dental Research, Department of Histology and Pathology, N.I.H. (Bethesda). In March he presented a paper on "Microcirculation in the Palatal Mucosa" at the annual meeting of the International Association for Dental Research (Pittsburgh). Dr. Provenza attended the three sessions of the Institute for Advanced Education in Dental Re-



search, sponsored by the American College of Dentists, held in Warrenton, Va., April 12-24; Tucson, Arizona, November 11-16; and Washington, D. C., November 17-24.

Dr. Richard Lindenberg, Lecturer in Neuroanatomy, presented four papers: March 27, "The Acute Circulatory Cerebral Edema, Its Pathogenesis and Clinical Significance," Teachenor Memorial Lecture — Kansas City, Mo.; April 27, "Systemic Circulation and Its Significance for the Intracranial Visual System," annual meeting of Wilmer Residents Association, Johns Hopkins Hospital; May 14, "Alcohol and Brain," Professional Seminar on Alcoholic Studies (Baltimore); October 24, "Vascular Compression Involving Intracranial Visual Pathways," American Academy of Ophthalmology and Otolaryngology (New York). He contributed the chapter on "Patterns of CNS Vulnerability in Acute Hypoxemia, Including Anesthesia Accidents" to *Selective Vulnerability of the Brain in Hypoxemia* (Symposium organized by CIOMS established under the joint auspices of Unesco and WHO)—Oxford: Blackwell Scientific Publications. With F. B. Walsh he contributed the article on "Die Veränderungen des Sehnerven bei Indirektem Trauma" to *Entwicklung und Fortschritt in der Augenheilkunde*—Stuttgart: Ferdinand Enke. With A. N. Rahman he wrote "The Neuropathology of Hereditary Dystopic Lipidosis," published in *Archives of Neurology*.

Claude P. Taylor, Director of Visual Education, presented three papers: February 26, "Construction of an Electronic Exposure Meter for Photomicrography," Capitol Chapter, Bio-

logical Photographic Association; April 25, "Photography as a Career," senior class of Howard County High School; May 6, "Dye Toning for Pictorial Type Photographs," The Lensmen of Baltimore. Mr. Taylor attended the Medical-Dental TV Workshop at the Naval Hospital (Bethesda), May 23-25, and the Eastman Kodak Industrial Photography Seminar (Washington), September 20.

Dr. H. Berton McCauley, Lecturer in Public Health Dentistry, is serving his fifth term as Historian, Maryland State Dental Association; was re-elected Treasurer, Maryland Public Health Association; and is Chairman of the Civil Defense Committee, Baltimore City Dental Society. Dr. McCauley served on the team of judges assigned by the A.D.A. to choose the winners of the Association's awards for the best dental-oriented exhibits by high school students at the 1963 National Science Fair International, held in Albuquerque, N. M.

Dr. Ethelbert Lovett, Lecturer in Ethics, announces the publication, in June, of the second edition of his book *An Approach to Ethics*.

Dr. William Kress, Assistant Professor of Orthodontics, is President of Phi Chapter, Omicron Kappa Upsilon, and President-Elect of the Middle Atlantic Society of Orthodontists. Dr. Kress was a member of a panel that discussed "Endodontics" at the February meeting of the Baltimore City Dental Society.

Gardner P. H. Foley, Professor of Dental Literature and Dental History, presided at the Atlantic City meeting of the American Academy of the History of Dentistry. He continues as Chairman of the M.D.K. Bremner Contest sponsored by the Acade-



my. He was reelected to the Board of Editors and as Assistant Editor of the *Journal of Dental Education*; he regularly contributes the "Quarterly Post" column to that journal. He is the Editor of the *Journal of the B.C.D.S.*, to which he contributes the column "From the Ranks of the File." Professor Foley is Chairman of the Committee on Student Writing of the American Association of Dental Editors. He was made a Fellow of the American College of Dentists at the Atlantic City Convocation of the College. At the annual meeting of the American Association of Dental Schools (Pittsburgh) he was the delegate from the faculty. He was the speaker at the Founders Day dinners of Xi Psi Phi and of Phi Delta Chi (School of Pharmacy). Professor Foley presented a paper on "The Dentist in Literature" before the annual meeting of the Washington, D. C. Area Medical Library Group, held in Baltimore, October 26.

Dr. J. Philip Norris, Assistant Professor of Oral Medicine, contributed an article on "Endodontic Management of the Acute Alveolar Abscess" to the September issue of the *Journal of the Maryland State Dental Association*. Dr. Norris is Chief Correspondent of the *J.M.S.D.A.* and is Assistant Treasurer of the Association. He is a member of the Executive Council and Chairman of Scientific Sessions of the Baltimore City Dental Society. He served as Grand Master of the Oriole Chapter, Psi Omega fraternity and as Co-Chairman of the Student Loan Fund. He is a member of the Executive Council and is Chairman of the General Arrangements Committee for June Week, of the Alumni Association. Dr. Norris is Secretary-Treasurer of

Phi Chapter, Omicron Kappa Upsilon.

Dr. Irving I. Abramson, Associate Professor of Oral Medicine, presented three clinics: April 16, "Endodontics—Why-When-Where and How," Washington County (Md.) Dental Society; November 19, "What Is Endodontics?," Maryland Academy of Medicine and Surgery (Baltimore); November 24, "Endodontics and Traumatic Injuries to the Teeth of Children," Johns Hopkins School of Hygiene and Public Health. Dr. Abramson also presented four papers: February 12, "Endodontics: Past-Present-Future," E. Alan Lieban Memorial Lecture (New York); February 18, "Pulpotomy," Children's Hospital (Baltimore); February 22-23, "Endodontics — Why-When-Where and How" and "Endodontics: An Aid in Fixed Partial Prosthesis," Massachusetts State Dental Association (Boston).

Dr. Kyrle W. Preis, Professor of Orthodontics, appeared before five dental groups: January 21, paper on "Childhood Habits and Their Effects on Dental Occlusion," Delaware Society of Dentistry for Children (Wilmington); February 13, table clinic on "Children's Habits," Baltimore City Dental Society; February 21, motion picture on "Oral and Facial Development," staff of Baltimore City Hospitals; May 5-9, scientific exhibit and table discussion on "Orthodontics," American Association of Orthodontists, Miami; November 3-6, motion picture and table discussion on "Effect of Pressure on Oral Development." Dr. Preis represented the University of Maryland at the Orthodontic Education Council meeting, held in Pittsburgh, March 27-28. On January 3 he spoke to the Delphi



Mothers Club of College Park, Md., on "Childhood Dental Problems." Dr. Preis is a member of the Board of Governors, Maryland State Dental Association, and of the Board of Censors, Middle Atlantic Society of Orthodontists. He is the chairman of the Judicial Council, Insurance Council and Ways and Means Committee of the M. S. D. Association; Ethics and Law Infractions Committee, of the Baltimore City Dental Society; and of the 125th Anniversary Meeting of the Alumni Association. Dr. Preis is dental consultant to the U.S.P.H.S. Hospital (Baltimore) and the Baltimore City Hospitals.

Dr. Joseph P. Cappuccio, Associate Professor of Oral Surgery and Anesthesiology, presented several papers and clinics: April 12, "Preparation of the Oral Cavity for Dentures," U. S. Naval Dental School (Bethesda); April 16, "Problems of Oral Surgery in Dental Practice," Mercer Dental Society (Trenton, N.J.); May 16-17, "How Far Do We Go Toward Saving the Periodontally Involved Teeth," Pennsylvania State Dental Association (Pittsburgh); October 21, "The Problems of Surgery in Dental Practice," Harford-Cecil Dental Society (Aberdeen, Md.); November 16, "The Contributions of Italian Americans to America," Fauchard Dental Society of New Jersey (Newark);

December 1-5, "Preparation of the Oral Cavity for Dentures," "Preparation of the Mouth for Operative Dentistry," and "The Difficult Extraction," Greater New York Dental Meeting. Dr. Cappuccio attended the U.S. State Department Regional Foreign Policy Conference in Philadelphia, March 27-28, as a delegate from the Maryland State Dental Association and the American Dental Association; and the A.D.A. Regional Legislative Conference held in Cherry Hill, N.J., July 28, as a Maryland delegate. Dr. Cappuccio served as chairman of the Maryland delegation to the A.D.A. meeting in Atlantic City. He was chairman of the Maryland Political Action Committee and Vice-Chairman of the Program Committee, of the Md. S.D.A. He was elected Secretary of the Alumni Association, President-Elect of Phi Chapter, Omicron Kappa Upsilon; Councillor of the Maryland Section of the International College of Dentists; Deputy Councillor of Alpha Chapter, Psi Omega Fraternity; Secretary of the Middle Atlantic Society of Oral Surgeons; member of the Executive Committee of the Baltimore Alumni Association and chairman of the Program Committee for the 125th Anniversary Meeting of the Alumni Association.

### SOLIDAY '63 WINS BREMNER AWARD

The fourth M.D.K. Bremner Award Contest sponsored by the American Academy of the History of Dentistry was won by J. Thomas Soliday, of Wheeling, W. Va., a member of Maryland's Class of 1963. The contest is open to the seniors of all the dental schools of this country and Canada. The subject of Soliday's paper is "James Baxter Bean." Dr. Soliday is presently interning at the Washington Hospital Center, Washington, D. C. He is the third Maryland senior to win the Award. Dr. Rolla R. Burk, Jr., won the first contest in 1960 and Dr. Laddie L. Jones won the third contest in 1962. In the second contest in 1961 Dr. Roy M. Naito placed second.



## FACULTY CHANGES FOR THE 1963-64 YEAR

Dean John J. Salley reports these faculty changes: the resignations of Dr. John P. Burton, Instructor in Oral Surgery; Dr. Michael V. Doran, Jr., Instructor in Oral Medicine; Dr. Alvin F. Gardner, Associate Professor in Pathology; Drs. David W. Heese, Instructor, and Yam-hin Louie, Associate Professor, in Operative Dentistry; Drs. Donald E. Lilley and Gilbert A. Vitek, Instructors in Pedodontics; Dr. Thomas Rutherford, Instructor in Oral Diagnosis; and Drs. Glenn D. Steele, Nelson A. Wright and George D. Yent, Jr., Instructors in Prosthodontics—the appointments of Dr. David Constantinos, Instructor in Oral Diagnosis; Drs. Renato P. DeSantis and John C. Pentzer, Instructors in Pedodontics; Dr. Barry Lever, Assistant Professor in Oral Medicine; Drs. Dean C. Johnson and James E. Palmer, Instructors in Prosthodontics; Dr. John Rasczewski, Instructor in Operative Dentistry; Drs. Mae Suminski and

Donald H. Wadsworth, Instructors in Oral Surgery; and Dr. Jackie G. Weatherred, Assistant Professor in Physiology.

Two members of the faculty received promotions: Dr. Walter L. Oggesen, Professor of Fixed Prosthodontics; and Dr. Wilbur O. Ramsey, Head of the Department of Prosthodontics.

Dr. Jose E. Medina was appointed to fill the newly created position of Assistant Dean; he will continue to serve as Professor and Head of the Department of Operative Dentistry.

Dr. Salley also reports two appointments that will begin on July 1: Dr. Charles E. Barr, presently at the Medical College of Virginia School of Dentistry, as Coordinator of Clinical Sciences and Associate Professor of Oral Medicine; and Dr. Martin Lunin, presently at the University of Texas Dental Branch, as Professor and Head of the Department of Pathology.

## AN EVENING OF RESEARCH

On March 3 the Baltimore Chapter of the International Association for Dental Research presented a program designed to give members of the various departments of the School an opportunity to present reports on their research before the Chapter's membership. The listing includes designations of the contributor, department and subject:

Charles B. Leonard, Jr. (Biochemistry): Amino Acid Incorporation and Ribosomal RNA.

H. B. Taragin, J. W. Sargent and A. H. Swain (Members of Senior Class): Use of Steroids in Reducing Pulpal Inflammation.

Sue-ning C. Barry (Histology): Carbohydrate Metabolism of *Streptococcus Salivarius*: II Manometric Measurement of Respiration under Vari-

ous Conditions.

Rodney F. Smith and Donald E. Shay (Microbiology): Mode of Azacholestane Action on *Saccharomyces Cerevisiae*.

Jose H. Diaz and Edmond G. Vanden Bosche (Operative Dentistry): A Comprehensive Study of Elastomeric Materials with Emphasis upon Those Factors Affecting Clinical Success.

John J. Salley (Pathology) and Jackie G. Weatherred: Riboflavin Deficiency in the Hamster.

Edward C. Dobbs (Pharmacology): Bioassay of an Azaspirane (T. C.). Jackie G. Weatherred (Physiology) and John J. Salley: Effects of Sex Hormones on Oral Carcinogenesis.

George W. Piavis (Anatomy): Cyto kinesis in the Sea Lamprey.



# INCIDENCE OF NASAL CARRIERS OF PATHOGENIC STAPHYLOCOCCUS AUREUS AMONG DENTAL ALUMNI

S. MARTIN PLIES AND DONALD E. SHAY—DEPARTMENT OF MICROBIOLOGY

At the 1963 annual alumni meeting of the Baltimore College of Dental Surgery, Dental School, University of Maryland, nasal swabs were prepared from the right and left nares of 76 dentists to determine what percentage of practicing dentists are nasal carriers of coagulase-positive *Staphylococcus aureus*. Wedgewood (1960) found dental groups to have a significantly greater carriage rate of penicillin-resistant staphylococci than medical groups. For additional reports on the staphylococcal problem among dentists the reader is referred to studies by Jensen (1961), Kenward (1960), Knighton (1960), McNeill, Paxson, and Verdi (1962), and Shay and Clendenin (1963).

The cultures obtained were inoculated onto PAS media containing 100 mcg/ml. polymyxin B sulfate (Burroughs Wellcome Co.), 400 mcg/ml. cycloheximide (Acti-Dione, BBL #04-678), and 4% NaCl. After 24 hours' incubation at 37° C., suspicious colonies were selected from the PAS plates and transferred to brain heart infusion agar (BBL #01-348) slants. The slants were incubated at 37° C. for 24 hours, and the resultant cultures were coagulase tested by inoculating a 4 mm. loopful of culture into .5 cc. of reconstituted coagulase rabbit plasma (BBL #73-056G). Coagulase readings were taken every hour for the first, second, and third hours and again at the end of 24 hours. If no coagulase reaction was observed at the end of 24 hours, the culture was considered to be coagulase-negative. All the coagulase-positive staphylococcal cultures were

phage-typed using 22 basic bacteriophages.

Of the 76 dentists swabbed 42 (55.26%) were found to be nasal carriers of coagulase-positive staphylococci. The 76 subjects swabbed represented dentists from 14 states and the District of Columbia.

Of the 50 dentists from Maryland 34 were faculty members of the Baltimore College of Dental Surgery. Fifteen of the 34 (44.12%) faculty members were carriers of coagulase-positive staphylococci. Knighton found 41.9% of the faculty members at the Medical College of Virginia, School of Dentistry to be nasal carriers of coagulase-positive staphylococci.

All the participating dentists were requested to complete a questionnaire that was designed to attach significance to the findings of this survey. The following questions were asked:

1. Year active practice was begun.
2. If retired, indicate the year.
3. Average number of patient contacts per year since 1960.
4. Do you occasionally practice your profession in hospital environment or clinics?
5. Do you conduct a full-time private practice independent of another dentist?
6. Were you under any type of antibacterial medication at the time the sample was collected? If so, name the antibiotic.
7. Are you troubled from time to time with chronic sinusitis?
8. Do any antibiotics give relief



to the sinusitis condition mentioned in question 7? If yes, name the antibiotic.

9. Have you been hospitalized within the last three years? Was a surgical procedure involved?
10. If there is any further information you wish to supply which you think is pertinent to this study, please indicate it in the space below.

The answers received to the first question indicated that several of the dentists were recent graduates. It was found that the 76 dentists had been practicing an average of 18.12 years. Only 2 of the dentists swabbed had retired from active practice at the time the swabs were obtained, one in 1940 and the other in 1963. A third dentist was now only in semi-practice.

Eleven dentists did not reply to question 3 dealing with the average number of patients seen by the dentist per year since 1960 due to their being retired, recent graduates, or just not having any reasonable idea. Of the 65 dentists reporting, the average number of patients per year was 3,201.

Fifty-three of the 76 (69.74%) dentists reported that they now practice or have practiced dentistry in hospital or clinic environments since 1960. This information may explain the relatively large average number of patient contacts by each dentist per year since 1960.

Forty-one of the dentists reported that they have private practices independent of another dentist; the remaining 35 either conduct part-time practice or have an associate.

Only 2 of the dentists reported that

they were under antibiotic treatment at the time they were swabbed. One was using topical neosporin and the other was using madribon. Three others reported the use of antibiotics just prior to the time they were swabbed. One used Terramycin (Oxytetracycline), another chloromycetin, and the other used Pentids and Pen-Streptomycin. It is interesting to note that all five of these dentists were found to be nasal carriers of coagulase-positive *Staphylococcus aureus*.

Twenty-six of the 76 dentists reported that they were troubled by chronic sinusitis. Seventeen of these 26 dentists (65.38%) reporting symptoms of sinusitis were found to be nasal carriers of potentially pathogenic staphylococci. This figure is statistically significant, and it appears that there is a direct relationship between the nasal carriage of *Staphylococcus aureus* and the incidence of chronic sinusitis. Four of these dentists obtained relief from the chronic sinusitis by using antibiotics. One used Otrivine, a second used Acromycin, and the other two used Ilosone.

Fourteen dentists had been hospitalized since 1960; 9 of them were carriers of *S. aureus*. Nine of the hospitalized dentists had had surgical procedures performed; 7 of them were found to be carriers. It would appear that being hospitalized increases the chances for becoming a staphylococcal carrier and that these chances are further increased if a surgical procedure is performed. However, it is not known how many of these carriers were or were not carriers prior to their hospitalization.

Several individual cases proved of



interest. One of the dentists had been hospitalized with a broken leg. He developed a hemolytic *S. aureus* infection beneath the cast of his leg and in the incision during his stay at the hospital. Chloromycetin was the antibiotic used to combat and eradicate this infection. This dentist was found to be a nasal carrier of *S. aureus*.

Another dentist reports having suffered from numerous boils. These boils were treated first by lancing and then by radiology treatments. Finally the dentist received injections of a staphylococcus vaccine weekly for 1 year which cleared up the condition. The boils have not recurred. However, this dentist was also found to be a nasal carrier of *S. aureus*.

A third dentist had been hospitalized for an appendectomy. He developed a staphylococcus infection of the internal organs for which the prescribed treatment was 2 weeks of Staphcillin and 2 weeks of Prostaphilin. After this treatment the infection cleared up. Stool and throat swabs taken at that time were found to be negative for *S. aureus*. However, this dentist was also found to be a nasal carrier of *S. aureus*.

From the results of this survey it appears that a significant number of dentists are nasal carriers of *S. aureus*. These organisms are potentially pathogenic and are capable of causing epidemics. The carrier may not suffer any ill effects from his

particular strain of *S. aureus*. But, his patients may be susceptible to infection by these organisms should transfer occur.

Although no transmission of *S. aureus* from carrier student-dentists to their patients has been reported in our studies to date, this finding by no means eliminates the possibility of transmission. It is, therefore, extremely important for the dentist, especially the carrier-dentist, to take all possible precautions to insure that *S. aureus* is not transmitted to the patient. Strict aseptic technics should be used, particularly when oral surgical procedures are performed. Instruments should be properly sterilized, and the operator should be scrubbed periodically. Wiping table tops, dental chair arms, bracket table, etc., with 70% alcohol is beneficial, and the smell of alcohol instills in the patient the comfortable feeling that the operator is free of contamination. Unfortunately, no effective method has been devised to eradicate the carrier state (Dooley, 1959; Green, 1961; Jarvis and Wigley, 1961; Kenward, 1960; and Martin, Nichols, and Henderson, 1960). Some methods, such as nasal antibiotic sprays, ointments, pastes, etc., have been found to limit the nasal carrier state, but it is only temporary as the carrier state will recur with either the same strain of *S. aureus* or an altogether new strain.



# PROPOSED CONSTITUTION AND BY-LAWS OF THE ALUMNI ASSOCIATION OF THE BALTIMORE COLLEGE OF DENTAL SURGERY, DENTAL SCHOOL, UNIVERSITY OF MARYLAND

The proposed Constitution and By-Laws and the Rules of Procedure for the Distinguished Alumnus Award are hereby submitted to the Alumni for their consideration in order that official action on them may be taken at the Annual Business Meeting of the Association on Thursday, June 4, 1964.

The Alumni Association wishes to acknowledge the cooperation of Dean Salley and Mr. Foley which has made it possible for us to include this material in the *Journal of the Baltimore College of Dental Surgery*, since the next issue of our own *Alma Mater* is not to be published until September, 1964.

## CONSTITUTION

### Article I—Name.

The name of this organization shall be the Alumni Association of the Baltimore College of Dental Surgery, Dental School, University of Maryland.

### Article II—Objectives

The objectives of the Association shall be to keep the interest of the alumnus in his Alma Mater; to provide occasional alumni gatherings that will serve as a common meeting ground where cherished friendships may be renewed and perpetuated; to inspire the graduates to give their moral support to the College administration in its efforts to sustain the fine traditions that distinguish the "Oldest Dental College in the World"; to induce the alumni to give, within reasonable limits, financial support to the general and/or special needs of the College; and to encourage, in every way possible, the continuing education of the alumni.

### Article III—Membership.

Membership in the Association shall consist of graduates of (a) The Baltimore College of Dental Surgery; (b) The Dental Department of the University of Maryland; (c) The Dental Department of the Baltimore Medical College; and (d) The Baltimore College of Dental Surgery, Dental School, University of Maryland; and (e) such other persons as shall qualify for membership under the special provisions outlined in the By-Laws of the Association.

### Article IV—Alumni Sections.

Sections of the Association shall be alumni societies organized in communities, states, or specified areas, with memberships composed of graduates of the Baltimore dental schools listed in Article III, and governed by a formal charter granted them by the Association.

### Article V—Government.

Section 1. Legislative Authority: The legislative body for the Association shall be all the voting members present at meetings called for the purpose of transacting the official business of the Association.



Section 2. Executive Authority: The executive body of the Association shall be an Executive Council, the members of which shall be chosen by the Association at its annual meetings.

#### **Article VI—Officers.**

The elective officers of the Association shall be a President, a President-Elect, a First Vice-President, a Second Vice-President, a Secretary, a Treasurer, a Historian-Archivist, and an Editor.

#### **Article VII—Meetings.**

There shall be an annual business meeting of the Association, and such other special meetings as the officers of the Association may deem necessary or desirable.

#### **Article VIII—Committees.**

The committees of this Association shall be of two kinds, (a) standing committees and (b) special committees.

#### **Article IX—Endowments.**

The Association may, at its discretion, create a special authority, or authorities, to accept under appropriate conditions any and all gifts, bequests, and endowments that may be offered it, and to apply all such gifts, bequests, and endowments to the particular purposes for which they may be intended.

#### **Article X—Alumni Journal.**

The Association may, at its discretion, provide for the publication of a periodical designed to serve the interests of the alumni and the needs of the Association.

#### **Article XI—Principles of Ethics.**

The sanctioned standards of professional conduct that shall be observed by members of the Association are those outlined in the official Code of Ethics of the American Dental Association.

### **BY-LAWS**

#### **Article I—Membership.**

Section 1. **The membership** of the Alumni Association of the Baltimore College of Dental Surgery, Dental School, University of Maryland shall consist of six classes:

- Active members
- Associate members
- Life members
- Honorary members
- Retired members
- Junior members

Section 2. **Active members** shall be those graduates of the Baltimore schools, as listed in Article III of the Constitution, who have paid the annual membership dues. They shall have the right to vote, to hold office, and to receive the alumni journal. Active membership shall be indicated by a formal membership card issued by the Treasurer upon the payment of annual dues.



Section 3. **Associate members** shall be graduates of accredited dental schools who may be employed as teachers in the College. A dentist who may have studied one or more years at the College, whose work was consistently satisfactory, who left the College in good standing and who later graduated from an accredited dental school is eligible for associate membership. Associate members shall be formally approved for membership by action of the Executive Council. They shall have all the privileges of active members excepting the right to hold elective office.

Section 4. **Life members.** Those persons who qualify for active or associate membership in the Association shall, upon the payment of a prescribed fee, become life members without further payment of dues. Life members shall enjoy all the privileges of active membership.

Section 5. **Honorary members.** Persons who have made notable contributions to the advancement of dental practice, of dental education, of dental literature, or who may have significantly advanced the cause of dentistry as an essential health service may be nominated by the Executive Council and elected by the Association to honorary membership. Honorary members shall not have the right to vote or to hold office. They shall be exempt from the payment of dues, fees or assessments.

Section 6. **Retired members.** Any active member of the Association who shall have retired from active participation in dental affairs, including the practice of dentistry, may, upon the recommendation of the Executive Council and the approval of the Association, be elected a retired member. Retired members shall enjoy all the privileges of active members **without** the payment of dues, fees or assessments.

Section 7. **Junior members.** All graduates of the Baltimore College of Dental Surgery, Dental School, University of Maryland shall, at the time of their graduation, be automatically admitted to junior membership in the Association for the period between commencement date and the 31st of the following December. They shall enjoy all the privileges of active members excepting the right to vote and to hold office. They shall be exempt from the payment of dues, fees or assessments.

#### **Article II—Dues and Assessments.**

Section 1. Dues for **active and associate members** shall be ten dollars (\$10.00) per year, payable January 1, of each year. Any active or associate member who fails to pay his dues by the time of the annual business meeting shall be deemed in arrears.

Section 2. Dues for **life members** shall be one hundred and fifty dollars (\$150.00), fifty dollars (\$50.00) of which shall be deposited to the credit of the Association's general fund, and one hundred dollars (\$100.00) shall be deposited to the credit of the Endowment Fund.

Section 3. **Assessments** may be levied on the members of the Association upon the recommendation of the Executive Council. Full explanation of the purpose of the assessment shall be made in writing and sent to the members along with the call for the meeting of the Association at which a vote on the proposed assessment will be taken.



**Article III—The Executive Council.**

Section 1. The Executive Council shall be composed of the **eight elective officers** of the Association, the **immediate past president** of the Association, and **six members** to be elected by the Association for terms of three years, two of whom shall be elected at each annual business meeting. The Presidents of the Alumni Sections shall be invited to attend the Executive Council meetings without a vote. The Chairman of the three Alumni Council representatives to the General Alumni Council and the Secretary-Treasurer of the Board of Trustees shall be invited to the Executive Council meetings without a vote. The members of the Alumni Council and the Board of Trustees may be invited to attend the Executive Council meetings without a vote. The voting members of the Executive Council shall be the eight elective officers of the Association, the Immediate Past President and the six members elected by the Association to the Executive Council.

Section 1-a. The Executive Council shall meet at least three times a year, the meetings to be held (a) not less than thirty days before an annual business meeting; (b) immediately following the adjournment of an annual business meeting; and (c) not more than sixty days after the date of an annual business meeting. Special meetings may be called at any time by the president or upon a petition signed by not less than five members of the Council.

Section 1-b. The Executive Council shall have the responsibility for administering the affairs of the Association between the dates of the annual business meetings. Its particular duties shall be to elect members of standing committees; to approve the annual budget; to authorize, in cases of need, the expenditure of funds supplemental to budgeted funds; to approve, in case of emergency, assessments of members to be voted upon at a meeting of the Association; to fill vacancies in elective offices excepting those of president and president-elect; to plan for triennial meetings and to fix the dates for same; to grant charters to alumni sections; to nominate for consideration by the Association distinguished persons for honorary membership; and to act as the custodian of all historical material placed in its keeping.

Section 1-c Vacancies among the **elected members** of the Council shall not be filled until the next regular annual meeting of the Association.

**Article IV—Officers and Their Duties.**

Section 1. The president shall preside at all meetings of the Association and all meetings of the Executive Council.

Section 1-a. He shall instruct the secretary to call all meetings of the Association and all meetings of the Executive Council, and all such special meetings of either that may be ordered. He shall, with the approval of the Executive Council, appoint special committees, shall be **ex-officio** member of all standing committees, and shall perform such routine duties as may from time to time, become the responsibility of a president.

Section 1-b. The president may cast the deciding vote in all cases of a tie **except** for the election of officers.



**President-Elect**

Section 2. The president-elect shall attend the meetings of the Association, the meetings of the Executive Committee, and the meetings of standing committees in order to become acquainted with the details of administrative procedures and of the general problems of the Association.

**First Vice-President.**

Section 3. The first vice-president shall, in the absence of the president, preside at the meetings of the Association and the meetings of the Executive Council. He shall assume all the duties of the president in case of his incapacitation. In case the office of president is vacated the first vice-president shall succeed automatically to the presidency.

**Second Vice-President**

Section 4. The second vice-president shall stand by to take over temporarily the duties of the first vice-president, and to succeed to the presidency in case of emergency.

**Secretary.**

Section 5. The secretary shall keep an accurate record of the proceedings of all meetings of the Association and of the Executive Council; shall send out announcements and calls for all meetings; shall have charge of all official correspondence; shall notify all officers of their election, and all members of committees of their appointment; and shall perform such other duties as may from time to time be assigned him by the Association and the Executive Council.

**Treasurer**

Section 6. The treasurer shall prepare and send bills for dues to the alumni at the first of each year; and shall include the junior members of the preceding graduating class; shall receive remittance of dues and assessments and shall deposit all such income to the credit of the Association; and shall send to each paid member an official membership card. He shall pay all valid bills incurred by the Association, by the Executive Council, the officers, and the various committees in the performance of their official duties. He shall keep an accurate record of all financial transactions and shall make an itemized report to the Association at its annual business meeting.

Section 6-a. The treasurer shall arrange for bond in an amount to be fixed by the Executive Council, the cost of such bond to be paid by the Association.

**Editor**

Section 7. The editor shall be responsible for collecting and editing all copy to be included in the official journal of the Association; shall submit for each issue prepared material arranged in good order for the convenience of the printer; and shall arrange for the prompt distribution of the journal when it comes from the press. He shall contract for such advertisements for the journal pages as may conform to the advertising standards of the American Association of Dental Editors.



Section 7-a. The editor shall not incur any expenses in excess of the amount included in the approved annual budget. In cases of necessity, he may appeal to the Executive Council for additional funds to meet extraordinary expenses.

### **Historian-Archivist**

Section 8. The historian-archivist shall be the custodian of the historical records of the Association; shall preserve all scientific and professional papers presented before the Association that are of historical importance; shall gather factual information concerning the history of the Association, particularly biographical material relating to (a) those alumni who have, through the years, contributed to the success of the Association, and (b) those alumni who have been the recipients of the **Distinguished Alumnus Award**.

Section 8-a. Historical and biographical material that may be assembled and put in permanent form by the historian-archivist shall be delivered to the Executive Council which shall arrange for its preservation and safe-keeping.

### **Article V—Election of Officers.**

Section 1. Nominations for all elective offices shall be made and elections held at the time of the annual business meeting of the Association. It shall be the duty of the nominating committee to make a report of the names of those whom it has selected to serve in the several elective offices. In addition to the names presented by the committee, other nominations may be made from the floor. In case of no contest, the election of nominees may be **viva voce vote**; in case of a contest, the election shall be by secret ballot.

### **Article VI—Committees and Their Duties.**

Section 1. All standing committees, unless otherwise provided for in the By-laws, shall be composed of five members. Nominations of members for all committees shall be made by the president subject to confirmation by a majority vote of the Executive Council. There shall be a Distinguished Alumnus Award Committee governed by the Rules of Procedure herewith appended.

Section 1-a. Upon the approval by the Association of Section 1, the president shall, at a meeting of the Executive Council, make nominations of members for election to places on committees. One member shall be elected for five years, one for four years, one for three years, one for two years, one for one year and thereafter one to be elected annually for a term of five years. The senior member of a committee shall serve as its chairman.

Section 1-b. It shall be the duty of each standing committee to submit to the budget committee, not later than thirty days after the date of the annual meeting, a proposed budget to provide for committee expenses for the ensuing year.

### **Committee on Nominations**

Section 2. The committee on nominations shall consist of five members as provided for in these By-laws to which shall be added the two immediate past presidents.



Section 2-a. It shall be the duty of the committee on nominations to select the names of persons to be voted upon for the offices of president-elect, first vice-president, second vice-president, secretary, treasurer, editor, a historian-archivist and delegates and alternates to represent the Association on the General Alumni Council. The list of nominees selected by the committee shall be submitted to the membership in the official call for the annual business meeting, and shall be reported directly to the annual business meeting of the Association for consideration.

#### **Committee on Constitution and By-laws.**

Section 3. It shall be the duty of the committee on constitution and by-laws to receive and to consider proposals for changes in the constitution and/or by-laws made by the members of the Association at large, by any of the committees or by the Executive Council. It shall recommend such amendments as seem to be in the interest of the better government of the Association. The committee shall submit any recommendations for change in the constitution and by-laws to the members of the Association not less than thirty days in advance of the annual business meeting.

#### **Committee on Membership.**

Section 4. The committee on membership shall undertake to increase the active, associate and life memberships, and may, if it elects to do so, recommend to the Executive Council the names of eligible persons for election to honorary membership.

Section 4-a. It shall keep in touch with the junior members and shall make a serious effort to interest them in becoming active members when their junior membership shall have expired.

Section 4-b. It shall contact the dentists, not graduates of the College, who may be eligible for associate membership and invite them to become associate members of the Association.

Section 4-c. It shall make a serious effort to acquaint members, particularly those in the younger age brackets, with the advantages of **life membership**, and to induce them to become **life members**.

#### **Committee on Solicitations**

Section 5. The duty of the committee on solicitations shall be to discover potential sources of financial support, and to attempt to secure from them gifts, bequests, endowments, or donations that would increase the resources available to the Trustees of the Endowment Fund in carrying on their important work.

#### **Committee on Arrangements (June Week)**

Section 6. The committee on arrangements shall have charge of local arrangements for the regular annual meeting. It shall cooperate with the June Week committee of the College in planning the traditional five-year class reunions.

#### **Committee on Roster.**

Section 7. The roster committee shall be composed of the editor of the journal, the treasurer and the secretary. Its duty shall be to keep the membership roll up-to-date and to publish it periodically.



### **Committee on Budget.**

Section 8. The duties of this committee shall be to accept prepared budget requests from the officers and the committees of the Association for such funds as may be thought necessary to conduct the business of the Association for the ensuing year. It shall combine the several requests into a single annual budget statement that will show realistic estimates of all receipts and all expenditures anticipated for the year, and shall submit the completed budget with its recommendations to the Executive Council not later than thirty days after the date of the last annual business meeting of the Association.

### **Special Committees.**

Section 9. Special committees may be created at any meeting of the Association, or any meeting of the Executive Council, for the purpose of performing any duties not otherwise provided for in these by-laws. Such special committees shall serve not longer than the next succeeding annual business meeting of the Association.

Section 9-a The president shall appoint an ad hoc committee to make arrangements for the Triennial Meetings or Special Meetings.

### **Article VII—Delegates to the General Alumni Council.**

Section 1. In accordance with the provisions of the by-laws of the **General Alumni Council of the University of Maryland** this delegation shall consist of three members, to be elected by the Association, one for a three-year term, one for a two-year term, and one for a one-year term, and thereafter one member to be elected each year for a three-year term. The senior delegate shall serve as its chairman and shall be extended the privilege of attending the regular meetings of the Executive Council as an observer.

Section 1-a. The Association shall **elect three alternate delegates** annually, designated 1st, 2nd and 3rd alternate. The duty of an alternate delegate shall be to serve, if called upon, at meetings of the General Alumni Council in the event the regular delegate cannot attend. It shall be the responsibility of the regular delegate to arrange with an alternate delegate to attend meetings of the General Alumni Council in his place. In case of death, retirement or incapacitation alternate 1 shall fill the unexpired term.

Section 1-b. The duty of the delegates shall be to represent the interests of the College and the dental alumni on the General Alumni Council. In matters of extraordinary importance the delegation may call upon the Executive Council for **advice and guidance**. They shall make an annual report to the Association, and periodic reports to the Executive Council at its regular meetings.

### **Article VIII—Meetings.**

Section 1. **The Annual Meeting:** An annual business meeting of the Association shall be held in Baltimore either during commencement week at the University of Maryland, or at some earlier date within the calendar year, the time to be fixed at the discretion of the Executive Council.



Section 2. **Special Meetings:** Special meetings of the Association may be called for particular purposes by a majority vote of the Executive Council, or by petition signed by at least twenty voting members of the Association. Notice of the purpose of a special meeting and the date on which such meeting is to be held shall be clearly stated in the call and mailed to the membership of the Association at least two weeks prior to the date fixed for the meeting.

Section 3. **Triennial Meetings:** The Executive Council may, at its discretion, arrange to hold protracted sessions of the Association at approximately three-year intervals, such meetings to be designated as "Triennial Meetings." When such triennial meetings are held the regular annual business meeting of the Association shall be held in conjunction with it.

Section 4. **The Quorum:** Twenty voting members of the Association present at a regular annual meeting, or at any special meeting, shall constitute a quorum for transacting such business as may come before the Association for consideration and action.

#### **Article IX—Alumni Sections.**

Section 1. Alumni sections of the Association may be formed by alumni residing in a metropolitan area, a state, or a region, who shall be members of the parent organization, and who may join together for the purpose of establishing a temporary alumni section organization.

In order to be considered by the Association as eligible for a charter, the preliminary organization shall include at least fifteen alumni who shall prepare a constitution and by-laws for governing the section and shall effect a temporary organization for carrying on negotiations for a charter. Nothing shall be contained in the proposed constitution and by-laws for the section that may be in conflict with the provisions of the constitution and by-laws of the parent organization.

Section 2. Upon the receipt of an application for a section charter from a preliminary organization, accompanied with a properly prepared constitution and by-laws, the Executive Council shall, if it finds everything in good order, issue an alumni charter to the alumni section.

Section 3. The following alumni sections have conformed to all requirements, have been approved by the Executive Council, have been issued alumni section charters, and are now officially reorganized as **bona fide** sections of the Alumni Association of the Baltimore College of Dental Surgery, Dental School, University of Maryland:

1. The New Jersey Alumni Section.
2. The Rhode Island Alumni Section.
3. The Maine Alumni Section.

Section 3-a The Presidents of official Alumni Sections shall be invited to the Executive Council meetings without a vote.

#### **Article X—The Endowment Fund.**

Section 1. There is hereby created under the authority of the Association a special fund to be administered by a corporation and to be known



as *The Endowment Fund of the National Alumni Association of the Baltimore College of Dental Surgery, Dental School, University of Maryland, Incorporated 1946.*

Section 2. The Endowment Fund shall be administered by a Board of Trustees which shall consist of two classes of members known as *ex-officio trustees* and *elected trustees*.

The *ex-officio trustees* shall include the president, the president-elect, the secretary and the treasurer of the Association, and the dean of the College. The *elected trustees* shall be six in number and shall be elected by the Association for terms of three years. The number of elected members shall be divided equally between alumni residing in Maryland and alumni residing out of Maryland. Two elected members, one from Maryland and one from without Maryland, shall be elected annually. No elected member shall serve consecutively more than two terms of three years each.

Section 3. *The chairman* shall be elected from elected trustees of Maryland at the annual meeting of the Board of Trustees for the term of one year or until his successor shall be elected and qualified. A chairman may be re-elected. The secretary-treasurer shall be elected from the elected trustees of Maryland for a term of three years. A secretary-treasurer may be re-elected for three years. The secretary-treasurer shall represent the Trustees on the Executive Council of the Alumni Association without a vote.

Section 4. The trustees of the Fund shall accept gifts, bequests, endowments, and such other funds as may from time to time be made available to the Association. They shall be responsible for the proper allocation of funds or income from funds to the purposes for which donations were originally intended.

Section 5. The trustees shall establish such policies as may be necessary to govern the acceptance of funds that may be offered to the Association for special purposes, and shall formulate such rules as may be necessary for the proper administration of the fund or funds for which they are responsible, such rules and regulations to be approved by a majority vote of the Executive Council.

#### Article XI—Amendments.

All proposals to amend the constitution or the by-laws shall be in writing and shall be submitted at an annual business meeting of the Association by the committee on constitution and by-laws, or by petition signed by not less than five members of the Association in good standing. The constitution and by-laws shall be acted upon only at the annual business meeting, and may be adopted by a three-fourths majority vote of the eligible members present and voting.

#### Article XII—Rules of Order.

The meetings of the Association and of the Executive Council shall be conducted according to the rules of order outlined in the *Sturgis Code of Parliamentary Procedure*.



## A STANDING RESOLUTION

*Whereas*, it has long been a custom for educational, scientific, and cultural institutions to honor those of their numbers who have attained unusual heights of distinction, and

*Whereas*, the Baltimore College of Dental Surgery, Dental School, University of Maryland, "The Oldest Dental College in the World," has produced its share of graduates who have ranked among the eminent leaders in dental practice, in dental education, in dental literature, and in making dentistry socially useful and,

*Whereas*, it is the sense of the Alumni Association of the Baltimore College of Dental Surgery, Dental School University of Maryland that it should establish some suitable means for recognizing those graduates of the college who have achieved positions of eminence in the dental profession; therefore, be it

*Resolved*, that the Alumni Association shall create a *Distinguished Alumnus Award* of a form and character to be determined by the Executive Council, the selection of recipients of the *award* to be made by it from among eminent alumni whose claim to high distinction is generally recognized by the dental profession, and the *award* to be conferred upon eligible candidates at such times as the Executive Council may consider appropriate. (There shall be a Distinguished Alumnus Award Committee governed by the rules of procedure herewith appended)

## RULES OF PROCEDURE FOR THE DISTINGUISHED ALUMNUS AWARD (JUNE, 1964)

### 1

There shall be a Distinguished Alumnus Award Committee consisting of seven members who are broadly representative of the dental alumni membership, each of whom shall have been a member of the Alumni Association of the Baltimore College of Dental Surgery, Dental School, University of Maryland for not less than three years. To the fullest possible extent, nominees to this committee shall be actively interested members of the Alumni Association.

### 2

No member of the Award Committee appointed for a full term of seven years shall be eligible for reappointment until the expiration of one year after the close of his term. A vacancy occurring in the committee between periods of regular appointment shall be filled for the remainder of the term by appointment by the President of the Alumni Association with the approval of the Executive Council.

### 3

The Distinguished Alumnus Award Committee is charged with the nomination of the recipient or recipients of the Distinguished Alumnus Award. In preparation for the performance of its duties, the Committee shall formulate a detailed procedure to be approved and published by the Executive Council. The nominee or nominees for the award shall have the approval of the Executive Committee of the Alumni Association.



## 4

The Committee shall meet initially once a year before the month of October to organize itself and fix the time of its future meetings. The Committee shall elect its own chairman and secretary. Its proceedings should be secret and all information held confidential. It may invite and shall receive and consider all communications in reference to persons proposed as recipients of the Distinguished Alumnus Award, and shall make careful examinations as to their eligibility. Absence of a member of the Award Committee from two consecutive meetings, without a valid reason communicated to the chairman of the Committee, shall vacate the member's position on the Committee.

## 5

It shall not be mandatory that the Distinguished Alumnus Award be given annually. If the committee is unable to decide on a candidate in a given year, it would be best to make no award for that year but to continue the evaluation of candidates for another year so that only deserving candidates who have been thoroughly considered will receive the Award.

## 6

The Committee shall be fully responsible for evaluating, nominating and organizing the mechanics for conferring the Distinguished Alumnus Award on the candidate or candidates.

## 7

The Award shall be bestowed on the candidate in the name of the Alumni Association of the Baltimore College of Dental Surgery, Dental School, University of Maryland at the annual banquet held in June unless a more appropriate time is selected by the Award Committee.

## 8

The President of the Alumni Association shall present the Award unless for good and sufficient reasons he wants to designate another person to make the presentation.

## 9

The chairman of the Award Committee shall be responsible for securing the Award and having it suitably inscribed.

## 10

The candidate to be selected must be a graduate of the Baltimore College of Dental Surgery, Dental School, University of Maryland and show outstanding qualities of leadership in the following categories:

- A. General Dentistry or Its Specialties.
- B. Education.
- C. Political Science.
- D. Research.
- E. Administration.
- F. Federal Dental Services.
- G. Community Service.



## 11

The Award Committee shall at periodic intervals advise all graduates of the Baltimore College of Dental Surgery, Dental School, University of Maryland of the duties of the Committee and ask for the names of potential nominees to be submitted in writing to the Chairman of the Award Committee.

## 12

The Award Committee shall maintain a continuing file of all potential candidates for the use of future Award Committees. The file shall be kept in the possession of the current chairman of the Award Committee. It shall be the duty of the retiring chairman to transfer the file to the new chairman within a period of sixty days. In the event this is not done within the specified time limit it shall be the responsibility of the President of the Alumni Association to see that it is done as soon as possible.

## 13

Each year the Executive Council should provide an adequate budget for the Award Committee work.

## 14

The chairman of the Award Committee will be responsible for transmitting information regarding the transactions of the Committee to the Publicity Committee of the Association, who shall see that all publications of the Dental School and the University of Maryland are promptly notified of the details of the presentation ceremony and all matters related to selection of recipients for the Distinguished Alumnus Award.

## 15

The Award Committee shall meet at least twice a year. The time and place of the meeting shall be set by the chairman. It will be the duty of the chairman to communicate with the members of the Committee immediately after his appointment and to begin gathering information on possible candidates for the nomination of the Distinguished Alumnus Award. The entire file of candidates will be considered each year by the Award Committee.

## 16

Seven men shall be appointed to the first committee. The original term of service shall be determined by lot. Thereafter, there shall be an annual appointment by the President of one member for seven years subject to the approval of the Executive Council. The changes in the personnel of the Committee should coincide with the annual change of administration of the officers of the Alumni Association.



## STUDENT OFFICERS FOR 1963-64 YEAR

Senior Class: President, Wayne L. O'Roark, Chevy Chase, Md.; Vice-President, John P. Hackett, Woodstown, N.J.; Secretary, Victor E. Spiro, Stoughton, Mass.; Treasurer, Charles M. Rosenberg, Atlanta, Ga. Student Senate Representatives: Lucien E. Benoit, Woonsocket, R.I., and Charles E. Toomey, Elkridge, Md.

Junior Class: President, Robert J. Carey, Baltimore; Vice-President, George E. Dent, Jr., Hyattsville, Md.; Secretary, Charles A. Gagne, Douglas, Mass.; Treasurer, John J. Golski, Somerville, N.J. Student Senate Representatives, Martin L. Chaput, Salem, Mass.; and Joseph E. Mazikas, South Fork, Pa.

Sophomore Class: President, Allan M. Dworkin, Baltimore; Vice-President, Mario P. DiSabatino, Wilmington, Del.; Secretary, Jurate E. Palubis, Baltimore; Treasurer, Raoul C. Vanden Bosche, Towson, Md. Student Senate Representatives: Thomas P. Conaty, Wilmington, Del., and T. James Wagner, Baltimore.

Freshman Class: President, John N. Faniola, Plainville, Conn.; Vice-President, John Vandenberg, Baltimore; Secretary, Ann Bergstresser, Sunbury, Pa.; Treasurer, Stuart A. Schwartz, Elmont, N.Y. Student Senate Representatives: Philip C. Brown, Darlington, Md., and Howard G. Rosenberg, Ft. Pierce, Fla.

Alpha Omega: President, Harold B. Levine, Miami, Fla.; Vice-President, Herschel Kaufman, Charleston, S.C.; Secretary, Charles Rosenberg, Atlanta, Ga.; Treasurer, Norman Ressin, Baltimore; Assistant Treasurer, Philip Ferris, Silver Spring, Md.; Chaplain, Ronald Wershba, Brooklyn, N.Y.; Historian, Albert

Dorfman, Silver Spring, Md.; Sergeant at Arms, Irving Raksin, Baltimore.

Psi Omega: Grand Master, John F. Patterson, Baltimore; Junior Master, John W. Hathaway, Plymouth, Mass.; Secretary, Stephen N. Sovich, Baltimore; Treasurer, Joseph E. Mazikas, South Fork, Pa.; Chaplain, Robert P. Padousis, Baltimore.

Sigma Epsilon Delta: President, Victor E. Spiro, Stoughton, Mass.; Vice-President, Steven A. Nachman, Baltimore; Secretary, Leroy Goren, Baltimore; Treasurer, Victor E. Spiro.

Xi Psi Phi: President, Francis Fraser, Baltimore; Vice-President, Edward Grace, Mamaroneck, N.Y.; Secretary, James L. Schatz, Baltimore; Treasurer, Albert E. Carlotti, Warwick, R.I.; Chaplain, John J. Jordan, Pittston, Pa.; Editor, David L. White, Jr., Oakland, Cal.

Gorgas Odontological Society: President, Francis Fraser, Baltimore; Vice-President, John Jordan, Pittston, Pa.; Secretary, Robert P. Nitzell, Hagerstown, Md.; Treasurer, James L. Schatz, Baltimore; Historian, Charles Rosenberg, Atlanta, Ga.; Sergeant at Arms, Lance Petersen, Rockville, Md.

Interfraternity Council: President, Victor E. Spiro, Stoughton, Mass.; Vice-President, Francis Fraser, Baltimore; Secretary, Harold B. Levine, Miami, Fla.; Treasurer, John F. Patterson, Baltimore.

Student Senate: President, Malcolm McInnis, Dighton, Mass.; Vice-President, Thomas K. Guglielmo, Passaic, N.J.; Secretary-Treasurer, James E. Bradley, Takoma Park, Md.













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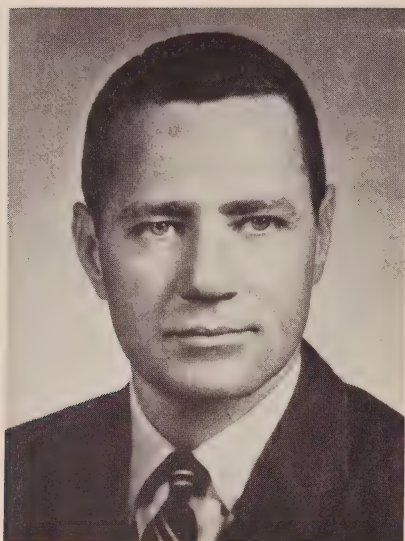
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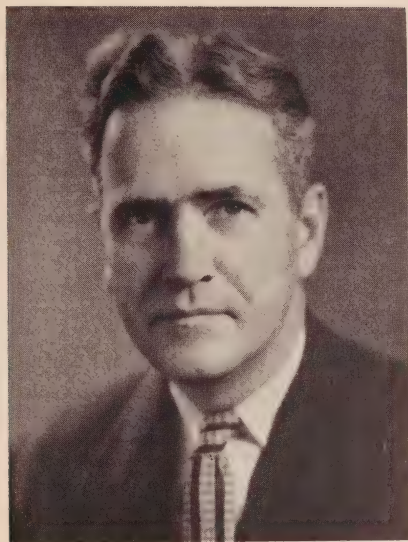


## A Message from Dean Salley

Celebration of June Week, 1965, will begin on Wednesday, June 2nd and will culminate at the Cole Field House on the College Park Campus on Saturday morning, June 5th with the conferring of degrees by President Elkins. A most important event during this period will be the Precommencement Exercises for the graduates of the Dental School to be held on Friday morning, June 4th in the Health Sciences Library Auditorium, Baltimore Campus, beginning at 9:30 a.m. It is at this time each year that we recognize our Honor Students in the graduating class. The Honorable Thomas B. Finan, Attorney General of the State of Maryland, will be our principal speaker. I look forward to having all of our returning Dental Alumni join with the Faculty in recognizing this festive occasion for our graduates.

I look forward also to welcoming back the many classes who will be celebrating reunions in 1965. On behalf of the Faculty may I extend warm congratulations to the classes of 1915 of the Baltimore College of Dental Surgery and the University of Maryland. Your fine records of contributions to the profession and to your Alma Mater are deeply appreciated.





A Tribute to  
Professor Foley,  
The Past Editor

"Of our language he was the lodestar." These, though the words of Lydgate, are poignantly applicable to our past editor, Professor Gardner P. H. Foley, whose pressing academic demands necessitated the termination of his responsibilities as editor of this publication. Mr. Foley has served *The Journal of the Baltimore College of Dental Surgery* for the past twenty-two years. His scholarly papers which have been published in the *Journal of the American Dental Association*, *Journal of American College of Dentists*, *Journal of Dental Education*, *Bulletin of the American Association of Public Health Dentists*, *New York Journal of Dentistry*, *Journal of the American Medical Association*, *Yankee*, and numerous others have brought him national recognition and have inspired many.

Mr. Foley, our heartfelt gratitude for your dedicated years of service! While "words are but empty thanks" (Cibber), one can but hope that "thanksgiving for a former doth invite God to bestow a second benefit" (Herrick).



# 1965-1966 Continuing Education Courses to be Presented at the University of Maryland School of Dentistry

(ALL DATES ARE TENTATIVE)

| <i>SUBJECT OF COURSE</i>  | <i>TENTATIVE DATE</i> |
|---|-----------------------|
| Pain Control in Dental Practice   | September 30, 1965    |
| Pin Retention in Restorative Dentistry  | October 15, 1965      |
| Elastic Impression Materials  | November 19, 1965     |
| Developing Impressions for Complete Dentures  | December 1-2, 1965    |
| Periodontics: The Why, When, How for the Practitioner<br>(This course will be presented in conjunction with the Southern<br>Maryland Dental Society.) | January 12, 1966      |
| Oral Surgery in a General Practice  | February 2, 1966      |
| Dental Radiological Health  | March 3, 1966         |
| Recent Advancements in Pedodontics  | April 6-7, 1966       |
| Restorative Dental Materials  | April 14, 1966        |
| Practice Management   | May 18-19, 1966       |
| Continuing Education in Orthodontics<br>(This course will be presented once a month for a period of three<br>months.)                                 | To be announced       |

Information regarding these courses may be obtained by contacting Dr. Donald E. Shay, Director of Continuing Education, University of Maryland School of Dentistry, 618 West Lombard Street, Baltimore, Maryland 21201. Telephone: 955-7538.



# The Isolation of Coli-Dysentery Bacteriophages and Their Correlation to the T Phages of *ESCHERICHIA COLI* 'B'

EARL F. BECKER\* AND MARY L. ROBBINS\*\*

## INTRODUCTION

The independent discovery of agents capable of lysing staphylococcal broth cultures by Twort<sup>17</sup> in 1915 and lysing bacillary dysentery broth cultures by d'Herelle<sup>10</sup> in 1917 has led to the isolation of bacteriophages able to lyse a great many different groups of bacteria<sup>2</sup>.

D'Herelle applied the term "bacteriophage" (bacteria eater) to these lytic agents and rightly maintained that they were filterable viruses with an ability to parasitize the bacterial cell<sup>11 12</sup>.

Salmonella and coli-dysentery phages were studied rather extensively by Burnet<sup>3 4 5</sup> and Burnet and McKie<sup>6 7</sup> during the early 1930's.

Coliphages were mentioned as early as 1933 by Schlesinger<sup>16</sup> and a group of seven coli-dysentery phages were described by Demerec and Fano in 1945<sup>13</sup>. Many investigators have studied these seven coliphages and reviews of their work have been made by Delbruck<sup>8 9</sup>. A more comprehensive review of bacteriophages was offered by Adams in 1957<sup>2</sup>.

An investigation was undertaken to see how many bacteriophages could be

isolated from sewage and fecal specimens obtained from the Baltimore area against coli-dysentery cultures acquired from Egypt (U.A.R.) and from stock cultures of the George Washington University collection. These isolated phages were studied further by serological and cross-infectivity experiments to determine if they were related in any manner to the T series of phages.

## MATERIALS AND METHODS

The source of each of the 26 bacterial strains employed in this study are listed in Table 1.

The cultures from Egypt were isolated from Egyptian felahin suffering from dysentery. The remaining cultures were from the culture collection maintained at the Bacteriology Department of the George Washington University.

The T bacteriophages and their respective antisera were also obtained from that department.

Sewage samples from the Back River and Patapsco Sewage Plants of Baltimore, Maryland, and a saline suspension of a pooled fecal specimen from the University of Maryland Hospital were used as potential sources of bacteriophage.

The methods used for the isolation

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of bacteriophages from the sewage and fecal sources, the purification and preparation of high titer phage stocks, the cross-infectivity studies and the serological relationship of the isolated bacteriophage to T phage antisera were essentially those described by Adams<sup>1</sup>.

Both the broth lysis and the plating techniques were employed for the isolation of bacteriophages. The latter method was modified by utilizing the soft agar layer method to spread the phage-host cell mixture evenly across the surface of the agar plate.

After the phages had been purified, a single plaque was stabbed with a sterile needle and transferred to 1 ml. of sterile nutrient broth. This amount was added to 10 ml. of nutrient broth and the broth lysis procedure was used. When lysis occurred, the culture was centrifuged at 5000 r.p.m. for 20 minutes and filtered through a Corning ultrafine fritted glass filter.

Every 10 ml. of nutrient broth was inoculated with 1 ml. of the purified phage filtrate and 0.05 ml. of an aerated culture of the host bacterium was prepared by aerating at 37° C. with a Model 20 White Mist air pump for an 8-hour interval. The broth lysis method was again used. Centrifugation and fritted glass filtration were done when lysis of the phage-host culture had developed. This filtrate was designated as the stock phage and stored in the freezer at -5° C.

The stock phages were assayed for the number of phage particles per ml. by the agar layer method.

Cross-infection studies by the isolated stock phages were accomplished by the broth lysis and the soft agar plating methods. Each phage was tested against the 26 bacterial strains.

All seven T phages were also tested against these strains in the same manner, to determine whether or not a host-range relationship existed between the isolated phages and those of the T series.

For the serological relationship of the stock phages to the antisera of the T phages, a 1:10 and 1:100 dilution of the antisera of each of the seven T phages was made. Each stock phage was diluted to  $10^3$  particles per ml. The 1:10 dilutions of the T phages antisera were pipetted into 7 tubes containing 0.3 ml. of nutrient broth in 0.1 ml. aliquots. The 1:100 dilutions of these antisera were also pipetted into 7 other tubes containing 0.3 ml. of nutrient broth in 0.1 ml. amounts. Into each of these 14 tubes, 0.1 ml. of the  $10^3$  per ml. stock phage was pipetted. A control tube comprised of 0.3 ml. of nutrient broth and 0.1 ml. of the  $10^3$  per ml. stock phage was also set up. All tubes were then incubated at 37° C. for a 30-minute interval. A thick suspension of the host organism was prepared by washing an 18-24 hour growth at 37° C. of the host organism off a 2% nutrient agar slant with 2.5 ml. of nutrient broth. One drop (0.05 ml.) of this thick suspension was then added to each tube. The solution in each tube was added to separate tubes of 3 ml. of soft agar and then poured onto agar plates. After overnight incubation at 37° C., the plates were examined for plaques. The absence of plaques or great reduction of plaques as compared to the control plate was indicative of inactivation of the stock phage by the corresponding T phage antiserum. Inactivation of a stock phage therefore signified a serological relationship to the T phage from which the antiserum had been prepared.



## RESULTS

The results of the phages isolated from the sewage and fecal sources and their respective susceptible host strain are recorded in Table 2. Twenty-one bacterial strains were infected, but 23 phages were isolated since both *E. coli* 'B' strains (R-442 and R-443) were each infected by two phages. Only five of the 26 host strains investigated proved to be resistant to any such phage activity. These were both strains of *Sh. dysenteriae* serotype 3 and three strains of enteropathogenic *E. coli*.

Only three of the isolated phages were found to be serologically related to the T phages. These were the phages R-442P2, R-443P2 and R-181P, which were isolated from the *E. coli* 'B' strains, and one *E. paracolon* strain. These results, tabulated in Table 3 reveal their relationship to the T even phages.

Data on the cross-infectivity studies is contained in Table 4. Two phages (R-172P and R-176P) did not infect any organisms other than their specific host.

A pattern of sensitivity to the same group of phages is observed for the *Sh. dysenteriae* serotype 2 and *E. coli* 'psi' strains. Similar patterns of sensitivity are observed for the *Sh. flexneri* serotype 6 strains and also among the two strains of *E. coli* 'B' and *E. paracolon* (R-181).

The phage (C-110P) isolated from *Sh. flexneri* serotype 3 was the most active one isolated.

The enteropathogenic strains appear to be relatively resistant to infection by the isolated stock phages.

The cross-infectivity studies of the T phages against the 26 strains investigated are recorded on Table 5. The most susceptible group of organisms

to the isolated stock phages, the *Sh. dysenteriae* serotype 2 and *E. coli* 'psi' strains, were completely resistant to all the T phages. Strains R-174, R-176 and two strains of the enteropathogenic *E. coli* (R-292 and R-293) were also completely resistant to infection by the T phages.

Only the two indicators *E. coli* 'B' strains and *E. paracolon* (R-181) were infected by all seven of the T phages.

## DISCUSSION

The *E. coli* strains with the notable exception of *E. coli* 'psi' offered considerable resistance to the bacteriophages isolated from the *Shigella* strains. A similar observation was made by Burnet and McKie<sup>7</sup> in trying to infect an *E. coli* communioid strain with phages isolated from dysentery bacteria.

The various strains of *Sh. dysenteriae* serotype 2 and *Sh. flexneri* serotype 4a as well as *E. coli* 'psi' on the other hand were resistant to the T phages.

The phages isolated from *Sh. dysenteriae* serotype 2 and *Sh. flexneri* serotype 6 offer clear examples of the extreme degree of specificity that can be exhibited by certain bacteriophages. This is probably due to a marked similarity in the chemical mosaic of the cell wall<sup>18</sup> and this mosaic could be a part of the antigenic pattern of these cells as was postulated by Burnet<sup>6</sup>.

It is interesting to note that *E. coli* 'psi' had a cross-infectivity pattern that was identical to those exhibited by the serotype 2 strains of *Sh. dysenteriae*. As *E. coli* 'psi' is sensitive to the bacteriocin, colicin, and there is a correlation between phage sensitivity and colicin sensitivity, the probability



exists that the serotype 2 strains of *Sh. dysenteriae* are also sensitive to colicin<sup>14, 15</sup>.

As *E. paracolon* (R-181) had a phage infectivity pattern identical to that of the two strains of *E. coli* 'B', it may be assumed that the former was actually a slow lactose fermenting mutant of an *E. coli* 'B' indicator strain.

That the three bacteriophages displayed no correlation with the T even phages in cross-infection studies but were related serologically to these T phages suggests they are probably mutants of these T even phages, since antiphage serum is relatively specific for its homologous phage.

Mutual exclusion is believed to have occurred in the pathogenic strain of *E. coli*, which was not infected by any of the potential phage sources but was infected by one phage (R-443P1) during the cross-infection tests.

On the basis of a lack of correlation in cross-infection patterns for the remaining isolated bacteriophages, it may be theorized that these phages were not as limited in their specificity for bacteria hosts as were the more specific phages isolated from *Sh. dysenteriae* serotype 2, *Sh. flexneri* serotype 6 and *E. coli* 'B' and *E. paracolon* strains.

#### SUMMARY

Twenty-three bacteriophages were isolated from 21 susceptible coli-dysentery bacteria, using two sewage samples and one fecal specimen as the phage sources.

Twenty of the 23 bacteriophages isolated were not related to the T series of phages by serological or cross-infectivity patterns.

The other three phages were related to the T even bacteriophages only on a serological basis. It is thought that

these three phages may be mutants of the T even phages.

A definite relationship between the antigenic structure of *Sh. dysenteriae* serotype 2 and *Sh. flexneri* serotype 6 bacilli and their susceptibility to those phages specifically isolated from their respective serological group was also established.

#### ACKNOWLEDGMENTS

The author wishes to express his gratitude and appreciation to Doctor Mary L. Robbins of the Department of Bacteriology of the George Washington University School of Medicine for her advice and supervision on this problem and to Doctor Donald E. Shay who allowed a large portion of this work to be accomplished in the laboratories of the University of Maryland Schools of Dentistry and Pharmacy.

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TABLE 1

COLI-DYSENTERY BACTERIA

| ORGANISM                                  | SEROTYPE | STRAIN | SOURCE |
|---|----------|--------|--------|
| <i>Shigella dysenteriae</i>               | 1        | R-183  | Egypt  |
|   | 2        | R-170  |        |
|   | 2        | R-171  |        |
|   | 2        | R-173  |        |
|   | 2        | R-178  |        |
|   | 2        | R-182  |        |
|   | 3        | R-177  |        |
|   | 3        | R-184  |        |
| <i>Shigella sonnei</i>                    | 2        | R-186  | Egypt  |
| <i>Shigella flexneri</i>                  | 2b       | R-185  | Egypt  |
|   | 3        | C-110  | G.W.U. |
|   | 4a       | R-172  | Egypt  |
|   | 6        | R-179  |        |
|   | 6        | R-180  |        |
|   | Rough    | R-175  |        |
| <i>Escherichia coli</i> entero-pathogenic | 0127:B8  | R-289  | G.W.U. |
|   | 0111:B4  | R-293  |        |
|   | 055:B5   | R-292  |        |
|   | 086:B7:H | R-291  |        |
|   | 0124:B17 | R-290  |        |
| <i>Escherichia coli</i> 'B'               |          | R-442  | G.W.U. |
|   |          | R-443  |        |
| <i>Escherichia coli</i> 'psi'             |          | R-4    | G.W.U. |
| <i>Escherichia paracolon</i>              |          | R-181  | Egypt  |
|   |          | R-174  |        |
| Alkaescens-Dispar Group                   | Rough    | R-176  | Egypt  |



TABLE 2  
ISOLATION OF PHAGES

| ORGANISM                                      | SEROTYPE | STRAIN | PHAGE<br>SOURCE    |
|---|----------|--------|--------------------|
| <i>Shigella dysenteriae</i>                   | 1        | R-183  | B.R.S <sup>1</sup> |
|   | 2        | R-170  |                    |
|   | 2        | R-171  |                    |
|   | 2        | R-173  | P.F.S <sup>2</sup> |
|   | 2        | R-178  | B.R.S              |
|   | 2        | R-182  |                    |
|   | 3        | R-177  | None               |
|   | 3        | R-184  |                    |
| <i>Shigella sonnei</i>                        | 2        | R-186  | B.R.S              |
| <i>Shigella flexneri</i>                      | 2b       | R-185  | B.R.S              |
|   | 3        | C-110  |                    |
|   | 4a       | R-172  | P.S <sup>3</sup>   |
|   | 6        | R-179  |                    |
|   | 6        | R-180  |                    |
|   | Rough    | R-175  | B.R.S              |
| <i>Escherichia coli</i> entero-<br>pathogenic | 0127:B8  | R-289  | None               |
|   | 0111:B4  | R-293  |                    |
|   | 055:B5   | R-292  |                    |
|   | 086:B7:H | R-291  | B.R.S              |
|   | 0124:B17 | R-290  | P.S                |
| <i>Escherichia coli</i> 'B'                   |          | R-442  | B.R.S              |
|   |          | R-443  |                    |
| <i>Escherichia coli</i> 'psi'                 |          | R-4    | P.F.S              |
| <i>Escherichia paracolon</i>                  |          | R-181  | B.R.S              |
|   |          | R-174  |                    |
| <i>Alkaescens-Dispar</i> Group                | Rough    | R-176  | P.S                |

1—Back River Sewage.

2—Pooled fecal specimen.

3—Patapsco Sewage.



TABLE 3

NEUTRALIZATION OF PHAGE WITH T PHAGE ANTISERUM

| PHAGE   | TYPE OF ANTISERA AND DILUTION |                          |                          |                          |                          |                          |                          |
|---------|-------------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
|         | T1<br>10 10 <sup>2</sup>      | T2<br>10 10 <sup>2</sup> | T3<br>10 10 <sup>2</sup> | T4<br>10 10 <sup>2</sup> | T5<br>10 10 <sup>2</sup> | T6<br>10 10 <sup>2</sup> | T7<br>10 10 <sup>2</sup> |
| R-442P2 | —                             | +                        | —                        | +                        | —                        | +                        | —                        |
| R-443P2 | —                             | +                        | —                        | +                        | —                        | +                        | —                        |
| R-181P  | —                             | +                        | —                        | +                        | —                        | +                        | —                        |

+ = neutralization.  
 — = no neutralization.







TABLE 4

## RESULTS OF CROSS-INFECTIVITY STUDIES—(Continued)

|                           |          | BACTERIOPHAGES |        |        |        |        |        |        |        |        |       |        |        |        |        |        |        |         |         |         |         |      |        |        |        |  |
|---------------------------|----------|----------------|--------|--------|--------|--------|--------|--------|--------|--------|-------|--------|--------|--------|--------|--------|--------|---------|---------|---------|---------|------|--------|--------|--------|--|
| ORGANISM                  | SEROTYPE | STRAIN         | R-183P | R-170P | R-171P | R-173P | R-178P | R-182P | R-186P | R-185P | C-110 | R-172P | R-179P | R-180P | R-175P | R-291P | R-290P | R-442P1 | R-442P2 | R-443P1 | R-443P2 | R-4P | R-181P | R-174P | R-176P |  |
| E. coli entero-pathogenic | 0127:B8  | R-289          | —      | —      | —      | —      | —      | —      | —      | —      | —     | —      | —      | —      | —      | —      | —      | —       | —       | —       | —       | —    | —      | —      | —      |  |
|                           | 0111:B4  | R-293          | —      | —      | —      | —      | —      | —      | —      | —      | —     | —      | —      | —      | —      | —      | —      | —       | —       | —       | —       | —    | —      | —      | —      |  |
|                           | 055:B5   | R-292          | —      | —      | —      | —      | —      | —      | —      | —      | —     | —      | —      | —      | —      | —      | —      | —       | —       | —       | —       | —    | —      | —      | —      |  |
|                           | 086:B7:H | R-291          | —      | —      | —      | —      | —      | —      | +      | —      | —     | —      | —      | —      | —      | +      | —      | —       | —       | —       | —       | —    | —      | —      | —      |  |
|                           | 0124:B17 | R-290          | —      | —      | —      | —      | —      | —      | —      | —      | —     | —      | —      | —      | —      | —      | —      | —       | —       | —       | —       | —    | —      | —      | —      |  |
| E. coli 'B'               |          | R-442          | —      | —      | —      | —      | —      | —      | —      | —      | —     | —      | —      | —      | —      | —      | —      | —       | —       | —       | —       | —    | —      | —      | —      |  |
|                           |          | R-443          | —      | —      | —      | —      | —      | —      | —      | —      | —     | —      | —      | —      | —      | —      | —      | —       | —       | —       | —       | —    | —      | —      | —      |  |
| E. coli 'psi'             |          | R-4            | —      | +      | +      | +      | +      | +      | —      | —      | +     | —      | —      | —      | —      | —      | —      | —       | —       | —       | —       | +    | —      | —      | —      |  |
| E. paracolon              |          | R-181          | —      | —      | —      | —      | —      | —      | —      | —      | —     | —      | —      | —      | —      | —      | —      | —       | —       | —       | —       | —    | —      | —      | —      |  |
|                           |          | R-174          | —      | —      | —      | —      | —      | —      | —      | —      | —     | —      | —      | —      | —      | +      | —      | —       | —       | —       | —       | —    | —      | —      | —      |  |
| Alk.-Dispar Group         | Rough    | R-176          | +      | —      | —      | —      | —      | —      | —      | —      | —     | —      | —      | —      | —      | —      | —      | —       | —       | —       | —       | —    | —      | —      | +      |  |

+ = infectivity.

-- = no infectivity.



TABLE 5

## RESULTS OF INFECTIVITY STUDIES WITH T PHAGES

| ORGANISM                  | SEROTYPE | STRAIN | T1 | T2 | T3 | T4 | T5 | T6 | T7 |
|---------------------------|----------|--------|----|----|----|----|----|----|----|
| Sh. dysenteriae           | 1        | R-183  | +  | —  | +  | —  | —  | +  | +  |
|                           | 2        | R-170  | —  | —  | —  | —  | —  | —  | —  |
|                           | 2        | R-171  | —  | —  | —  | —  | —  | —  | —  |
|                           | 2        | R-173  | —  | —  | —  | —  | —  | —  | —  |
|                           | 2        | R-178  | —  | —  | —  | —  | —  | —  | —  |
|                           | 2        | R-182  | —  | —  | —  | —  | —  | —  | —  |
|                           | 3        | R-177  | —  | +  | —  | —  | —  | +  | —  |
|                           | 3        | R-184  | —  | +  | —  | —  | —  | +  | —  |
| Sh. sonnei                | 2        | R-186  | —  | —  | —  | —  | +  | —  | —  |
| Sh. flexneri              | 2b       | R-185  | —  | +  | —  | —  | —  | +  | —  |
|                           | 3        | C-110  | —  | +  | —  | —  | —  | +  | —  |
|                           | 4a       | R-172  | —  | —  | —  | —  | —  | —  | —  |
|                           | 6        | R-179  | —  | +  | +  | +  | —  | +  | +  |
|                           | 6        | R-180  | —  | +  | +  | +  | —  | +  | +  |
|                           | Rough    | R-175  | —  | +  | —  | —  | —  | +  | —  |
| E. coli entero-pathogenic | 0127:B8  | R-289  | —  | —  | +  | —  | +  | —  | +  |
|                           | 0111:B4  | R-293  | —  | —  | —  | —  | —  | —  | —  |
|                           | 055:B5   | R-292  | —  | —  | —  | —  | —  | —  | —  |
|                           | 086:B7:H | R-291  | —  | +  | —  | —  | +  | —  | —  |
|                           | 0124:B17 | R-290  | +  | —  | —  | —  | +  | —  | —  |
| E. coli 'B'               |          | R-442  | +  | +  | +  | +  | +  | +  | +  |
|                           |          | R-443  | +  | +  | +  | +  | +  | +  | +  |
| E. coli 'psi'             |          | R-4    | —  | —  | —  | —  | —  | —  | —  |
| E. paracolon              |          | R-181  | +  | +  | +  | +  | +  | +  | +  |
|                           |          | R-174  | —  | —  | —  | —  | —  | —  | —  |
| Alk.-Dispar Group         | Rough    | R-176  | —  | —  | —  | —  | —  | —  | —  |

+ = infectivity.

— = no infectivity.



# The Discoloration of Teeth Due to Tetracycline Therapy

MARTIN LUNIN\*

Reports by many investigators have disclosed the deleterious effects on the teeth caused by the administration of tetracyclines during tooth development both *in utero* and postnatally. Discoloration of the teeth was first observed in a group of patients with cystic fibrosis of the pancreas who had received antibiotic therapy over a long period.<sup>1</sup> Since then, other investigators have reported comparable results in similar groups of children.<sup>2</sup> The discoloration of teeth has also been reported in children who have received large quantities of tetracyclines for diseases other than cystic fibrosis.<sup>3 4 5</sup> Several papers have also described the association of various degrees of hypoplasia with tetracycline-disclosed teeth.<sup>6 7 8 9</sup> Similar changes in the teeth of rats have been demonstrated by Bevelander *et al.*<sup>10</sup>

In addition to the effects reported on developing teeth, studies have demonstrated the inhibition of skeletal growth in premature infants<sup>11 12</sup> and in chick embryos.<sup>13 14</sup> Several investigators have proven that the tetracyclines can pass through the placenta to the developing fetus.<sup>5 11 12 15</sup>

Oxytetracycline, chlortetracycline, and tetracycline all appear to behave similarly. Preliminary reports seem to indicate that dechlormethyltetracycline reacts as the other tetracyclines.<sup>15</sup>

At the time the drug is administered,

the tetracyclines are incorporated into the calcified dental tissues in the process of odontogenesis. They are retained throughout the life of the tooth. Discoloration of the tooth is a common result.

This report describes the dental results of tetracycline therapy in infancy in two brothers. They were 5 years 6 months and 3 years 4 months of age when examined. Both were healthy, well-formed children. Neither child exhibited any evidence of enamel hypoplasia or dental caries. The gin-

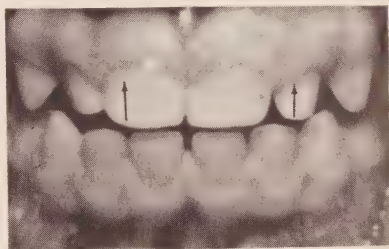


Fig. 1

THE DISCOLORATION (INDICATED BY ARROWS) IS BEST SEEN IN THE GINGIVAL THIRD OF THE UPPER ANTERIOR TEETH. ALL THE OTHER TEETH WERE ALSO DISCOLORED.

gival third of all the anterior teeth were discolored. When examined in a darkened room using ultra-violet light, the discolored areas fluoresced yellow rather than the normal blue auto-fluorescence of teeth.

\*Professor and Head, Department of Pathology



The older boy, whose teeth are seen in Figure 1, was thought by his mother to have had a healthy infancy. However, a review of the medical record disclosed that he had received short therapeutic doses of tetracycline and tetracycline-V drugs at birth, at 1 month and at 8 months of age.

His brother (Fig. 2) had several minor illnesses during infancy. His medical record similarly revealed that

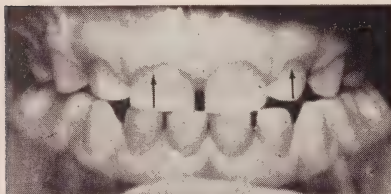


Fig. 2

he had been treated with tetracycline and tetracycline hydrochloride at 1½, 2 and 7 months of age.

### SUMMARY

The histories of two brothers are presented. Both were treated with tetracyclines during infancy for minor illnesses. Discolored deciduous teeth resulted in both cases.

This work was supported by grant DE 2192-02 from the National Institute of Dental Research.

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## An Evening of Research

The Baltimore Chapter of the International Association for Dental Research presented the Fourth Annual Program, *An Evening of Research*. Because of time limitations, only a few of the many research activities currently in progress in the dental school could be presented and discussed. In order to acquaint the readers with the nature of the investigations being conducted, abstracts of the programmed papers are published in this issue and will continue in the future.

Charles E. Barr, D.D.S.,  
"Osteogenic Activity in Acute Vitamin C Deficiency"

A study designed to determine the histochemical changes in the intercellular substance of connective tissues due to ascorbic acid deficiency has been designed and completed. Fifty pair-fed young male guinea pigs weighing 200-250 grams each were utilized. After approximately three weeks the experimental animals were rendered scorbutic, and at that time polyvinyl sponges were implanted in each femur. The experimental animals and their pair-fed mates were killed at intervals from 24 hours to 14 days, the femurs removed and fixed in 10% formalin, the recovered sponges sectioned and stained with H & E, Masson trichrome, Alcian blue—PAS (pH 2.7) with diastase controls, toluidine blue (.1% at pH 5.5) without previous sulfation and Wilder's reticulum stain. The results revealed that the scorbutic animals did not show the degree of osteogenesis evidenced by their pair-fed mates by the end of 14 days. The presence of

sulfated mucopolysaccharides was noted within the first week in the controls up to a peak at 5 to 7 days, whereas, it was either totally lacking or greatly diminished in the experimental group at all stages. Osteoid was noted within 7 days in the controls, but by 14 days the experimental animals exhibited a poorly formed network of reticulum fibers. As metachromasia decreased in the intercellular substance, more PAS positive material became apparent in the pair-fed controls. Results confirm that changes in the intercellular milieu of newly forming connective tissue noted morphologically in previous studies were due to a deficiency of ascorbic acid only, since strict dietary and nutritional controls were maintained through pair-feeding.

George W. Piavis, Ph.D.,  
"The Effects of 6-Methyl Mercaptopurine on Development in Sea Lamprey, *Petromyzon marinus*, embryos"

The several stages of sea lamprey embryos reared from artificially fertilized ova and maintained at 65°F. (18.4°C.) were exposed to varying concentrations of 6-methyl mercaptopurine (6-MP) for indefinite time periods. Observations were made under a stereomicroscope. After the random samples were culled of any dead embryos, the living embryos were returned to their proper containers. Embryos exposed to 6-MP were observed at least 4 times during a 24-hour period for the first week and, thereafter, at least twice during a 24-hour period until the experiments were terminated. Concomitant observations were made



of the controls. Results of these experiments indicate that cytokinesis will continue without interruption through Stage 8 (Blastula) in those embryos exposed at or shortly after fertilization. These embryos, however, are incapable of entering into or surviving through Stage 9 (Gastrula). Differentiation in Stage 9 or later embryos exposed to 6-MP is reduced or totally lacking.

William K. Collett, D.D.S.,

"Effects on Odontogenesis Following X-Irradiation of the Oral or Thyroid-Parathyroid Area of the Albino Rat"

It has been concluded from past investigations that many of the disturbances produced in the developing teeth of experimental animals subjected to irradiation were due to the local effect of ionizing radiation. However, it has also been reported that prolonged low level whole-body irradiation can cause a shift in mineral uptake by the incisor teeth of rats without evidence of gross or microscopic alterations in tooth development. Therefore, it is not unreasonable to suspect the existence of an indirect effect on tooth formation resulting from systemic changes induced by irradiation of other portions of the body.

The thyroid and parathyroid glands, although considered radioresistant, have been shown to control various phases of calcium homeostasis in the body. Injury or removal of these glands has been illustrated to elicit disturbances in tooth formation as well as to cause characteristic blood calcium and bone alterations. Thus, the thyroid-parathyroid region would appear to be representative of a relevant tissue in terms of indirect effects on teeth resulting from extraodontogenic X-irradiation.

This study recorded the odontogenic response in maxillary incisors of albino rats following exposure to short-term X-irradiation of the anterior head or thyroid-parathyroid area. It was found that there was a significant difference in odontogenesis from direct irradiation of the maxillary incisor as compared to indirect effects on odontogenesis following irradiation of the thyroid-parathyroid area. It was also noted that alkaline phosphatase levels in the incisors of head irradiated rats exhibited a significant difference from control values. However, no relationship could be found between alkaline phosphatase levels and the degree of tooth calcification. Experimental groups showed altered calcium mobilization patterns as compared to control animals, but there was little difference in these patterns between the two experimental groups.

George N. Krywolap, Ph.D.,

"Production In Nature of Antibiotics by a Mycorrhizal Fungus"

*Cenococcum graniforme*, a fungus which forms mycorrhizal associations with the roots of a wide variety of forest trees, has been shown to produce two antibiotics in its mycelium when grown in pure culture. One of these antibiotics is active against bacteria and the other against fungi. These antibiotics are relatively heat stable and active at acidic and neutral pH, thus suited for survival and activity in acidic forest soils in which *C. graniforme* is the predominant mycorrhizal symbiont.

Paper chromatography and bioautographs with *Bacillus cereus* were utilized to show that the anti-bacterial antibiotic is produced in nature by the



fungus during mycorrhizal association, and that the antibiotic is translocated through the tree. This was demonstrated for extracts of mycorrhizae, roots and needles from thirty-five year old red pine as well as extracts of roots and needles of two- and three-year old red and white pine seedlings.

Presence of the *C. graniforme* antibiotics in the tree suggests a low phytotoxicity for the antibiotics. It also indicates the possibility of a microbially-induced natural defense mechanism for trees infected with this fungus.

Martin Lunin, D.D.S.,

"Epithelial Rests and Cysts of the Gingiva"

Although gingival cysts are uncommon and have been reported infrequently, their pathogenesis poses an interesting problem. In a study to gain some insight into the development of gingival cysts, 266 gingival biopsies were examined histologically. Slabs 1 to 1.5 mm. in thickness were dissected from the gingival specimen. Serial sections were examined on those slabs that contained epithelial inclusions. Ninety of these slabs contained epithelial rests. They occurred equally in males and females and all age groups. Calcified inclusions are often found associated with gingival rests, although each may occur in the absence of the other. Evidence indicated that some of these rests might be derived from the proliferation of gingival epithelium. The similarity of some to the rests of Malassez is offered as evidence that some of these gingival rests may be remnants of dental laminae. Although it has never been conclusively demonstrated, there is a possibility that gin-

gival rests might be a source of odontogenic tumors and cysts.

Norton M. Ross, D.D.S.,

"A Preliminary Clinical Evaluation of Phenethicillin"

Two major problems which clinicians and investigators confronted in the first 15 years following the introduction of Penicillins G and V were the development of a high percent of allergenil reactions and the emergence of Penicillinase-producing microorganisms. Researchers attempted to develop a Penicillin which did not have cross-sensitivity with Penicillins G and V, and which was effective against the resistant strains of *Staphylococcus* which were plaguing many hospital systems at that time. In 1959, British investigators succeeded in isolating the Penicillin nucleus, with this isolation, the potential of substituting an almost unlimited variety of side chains into the nucleus became available, and many new Penicillins were produced.

The first of these so-called semi-synthetic Penicillins, named Phenoxymethyl Penicillin, or Phenethicillin, was introduced in 1960. It was soon obvious that Phenethicillin was not more active against the resistant *Staphylococcus*. Other antibiotics were introduced which represented a breakthrough in the control of the Penicillinase-producing organisms, and their importance overshadowed the possible value of Phenethicillin.

In clinical dentistry most infections with which we deal are caused by the Penicillin-sensitive gram positive organisms which make up the normal flora of the oral cavity, not by Penicillinase-producing organisms. An uncontrolled clinical study was therefore



attempted to determine the efficacy of Phenethicillin in treating oral infections. This drug was administered to 92 patients being treated for a variety of conditions, the majority of whom had acute dento-alveolar abscess. The antibiotic produced "clinically satisfactory" remissions of acute phases of infections in a mean of 4.3 days in 95 percent of the cases reported. Since this is at least as effective as Penicillin V, the need for further controlled study is indicated.

John I. White,\* Ph.D. and

John E. Bonas,

"Calcium Binding by the Sarcoplasmic Reticulum"

Contractile activity in skeletal muscle is dependent on the presence of free calcium in the sarcoplasm. At rest, most of the calcium of muscle is bound within the sarcoplasmic reticulum and the sarcoplasmic calcium level is low. Passage of an action potential wave along the fiber triggers release of bound calcium from the reticulum and initiates contraction. After repolarization of the membrane the released calcium is rebound and relaxation occurs.

Calcium binding requires energy provided by splitting of ATP, but little is yet known of the "pump mechanism". We have measured the calcium binding activity of isolated reticular "granule" preparations in the presence of ATP,  $Mg^{++}$  and inorganic phosphate. Extensive washing of granule preparations reduces the binding activity. Activity is restored by adding the "wash solution". On the basis of Sephadex fractionation and heat denaturation experiments, the material which activates washed granules seems

to be protein in nature. Ryanodine, an arrow poison which interferes with relaxation, does not appreciatively affect calcium binding by reticular granules.

D. Vincent Provenza, Ph.D. and  
Ramesh C. Sardana,\* B.Sc., D.D.S.

"Optical and Ultrastructural Characteristics of Prepared Tooth Surfaces"

Freshly extracted human non-carious premolars were subjected to cavity preparation using different burs and diamond stones. In some cases the cavity surfaces were finished appropriately with hand instruments and carborundum stones. Optical and electron micrographs of shadowed replicas of the preparations were examined.

Optical studies indicate that of the three types of rotary cutting instruments used, cross-cut fissure #557, smooth fissure #57 and diamond stone, the latter produced the roughest cavity wall while the smooth fissure bur formed the least scabrous surface. Each of the three rotary instruments formed identifying markings on the cut surfaces. While topographical identification of dentin and enamel was feasible when the cross-cut #557 bur was employed, it was more easily distinguished with the less scabrous effects of the #57 smooth fissure bur and the smoothing effects of the carborundum stone on the diamond prepared surfaces. Cavity walls prepared with fissure burs and finished with hand instruments produced irregularly scratched surfaces. Carborundum stones tended to have a smoothing effect on the diamond prepared surface.

At the electron microscopic level the bur and stone marks compared favorably to those of the optical level ex-



cept for the vertical striations which electron microscopically were not encountered. Scratches produced by the hand instruments appeared shallow and less prominent. Surface detail on enamel was masked by debris; while

in dentin, which was comparatively free of particulate material, surface asperities were noted. Contingent upon the type of cutting instrument used, the debris could be graded relative to size into coarse, medium and fine.

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## Research Support

If the purpose and motivating force underlying research is one of expanding the limits of knowledge, then research must be an integral part of an academic environment. That the research in any educational community will be varied is to be expected because of the diverse interests and training of the investigators. Thus, it can be anticipated that research will range from basic to applied. The heterogeneity of research not only ranges from pure to clinical, but spans an appreciable segment of the phylogenetic scale from snails through lampreys to man. The following are some of the research projects currently in progress for which research support has been obtained.

Regeneration in Sea Lamprey (Anatomy)

Odontogenesis in Man (Histology and Embryology)

Some Cytological Observations of the Secretory Epithelium of the Accessory Boring Organ of *Eupleura Caudata Etterae* and *Urosalpinx Cinererea Follyensis* (Histology and Embryology)

Optical and Ultrastructural Studies of Enamel and Dentin Surfaces as Related to Cavity Preparation (Histology and Embryology)

Carbohydrate Metabolism in *Streptococcus Salivarius* (Histology and Embryology)

Isolation and Transfer of Pathogenic Micrococci (Microbiology)

The Identification and Enumeration of Cultivable Anaerobes in the Oral Cavity of Patients with

Periodontal Involvement (Microbiology)

Osteogenesis in Experimental Ascorbic Acid Deficiency (Oral Medicine)

Periodontal Disease Indices (Oral Medicine)

The Effect of Tetracyclines on the Teeth of Children (Pathology)

The Effect of Irritants on Oral Tissues (Pathology and Physiology)

Quantitative Relation of EMG to Mandibular Position (Physiology)

Relaxation of Skeletal Muscles (Physiology)

Properties of Proteins in Saliva (Physiology)

Quantitatively, and possibly qualitatively, the research efforts can be measured in terms of the research support awarded to an institution. The total research support awarded to the dental school in the form of contracts, grants-in-aid and others exceeds \$273,000 annually. Part of this support as received by departments is as follows:

|  |             |
|--|-------------|
| Department of Anatomy                  | \$ 3,000.00 |
| Department of Histology and Embryology | 64,400.00   |
| Department of Microbiology             | 52,400.00   |
| Department of Oral Medicine            | 10,000.00   |
| Department of Pathology                | 19,700.00   |
| Department of Physiology               | 30,000.00   |
| Department of Pathology and Physiology | 27,000.00   |



# A Student Evaluation Study Within A General Practice Clinic

CHARLES E. BARR\*

A study to evaluate the advantages of a general practice clinic in dental education has been designed and was effected in November 1964. The project is being conducted in a newly equipped seven operator clinic constructed adjacent to the main clinic area and is a joint effort of the faculties of the

School of Dentistry and the College of Education.

The study proposes to evaluate student productivity, attitudes and professional demeanor in a clinical setting in which all dental services are performed in one operator. The senior class has been divided into groups of seven which are assigned to the clinic for a two-week period. In the single module

\* Coordinator of Clinical Sciences





clinic, students, under the supervision of a team of teachers representing the various clinical disciplines, render treatment to patients. Administered in this manner, the talents of the specialized instructional team, *via* geographic localization, enhances the educational opportunities within the modulated clinic.

Although conclusive data are as yet not available, trends relative to the quality and quantity of professional services rendered by the student in such an area are indicated. Preliminary assessment of student and patient reactions appears to strengthen the hypothesis that a more complete, efficient and comprehensive service can

be rendered the patient in this type of educational environment.

Evaluations regarding professional attainments, behavioral reactions and teaching methods are being executed by computer data processing through the University's Health Sciences Computer Center.

Adjunctive advantages aspired in this teaching environment are those in which students are acquainted with the more sophisticated apparatus available and information regarding equipping a modern office.

The study is planned to extend over a three- to four-year period anticipating the occupancy of the projected new dental building.

60

## Mrs. Ida M. Robinson Retires

After twenty years of service as a librarian for the Baltimore Campus of the University of Maryland, Mrs. Ida M. Robinson retires. The new four story Health Sciences Library Building, located on the southeast corner of Lombard and Greene Streets, accommodates 200,000 volumes and is staffed by 22 people. It stands as a tribute to her zealous efforts. What an overwhelming sense of satisfaction and accomplishment must be hers as she reflects back to 1944 when she inherited a collection of 43,000 volumes distributed in two buildings having a total capacity of 40,000 when she was funded \$8,000 for the purchase of books and when a staff of six cared for the library needs of the Schools of Dentistry, Medicine and Pharmacy.



In the words of Emerson, "The reward of a thing well done is to have it done."

In the coming year, Mrs. Robinson plans to travel around the world, *For-san et haec olim meminisse juvabit* (and perhaps sometime it will be pleasant to recall these things) Virgil.



# Baltimore College of Dental Surgery, Dental School, University of Maryland Marks 125th Anniversary

A three day celebration commemorating the 125th Anniversary of the founding of the Baltimore College of Dental Surgery was sponsored by the Alumni Association on March 4, 5, and 6, 1965. The professional and scientific presentations included *Preventive Dentistry Through Better Diag-*



*nosis* by Major Gen. Joseph L. Bernier, M.S., D.D.S.; a panel discussion on the *Socio-Economic Trends Affecting Dental Education and Dental Practice* with Harry B. McCarthy, D.D.S., Alvin L. Morris, D.D.S., Ph.D.; Kenneth V. Randolph, D.D.S. and Lewis Fox, D.D.S. as panelists moderated by John J. Salley, D.D.S., Ph.D.; a panel discussion, *General Discussion of the Psychosomatic Aspects of Dentistry* participated by Jacob H. Conn, M.D., F. Bruno Agnelli, M.D., John H. Manhold, Jr., D.M.D., M.A., and Irving I. Selter, D.D.S., M.A. and moderated by Wilbur O. Ramsey, D.D.S.; *The Past is Prologue*, First Hayden-Harris Memorial Lecture, by Dr. Harold Hillenbrand; *Progress Notes on the Development of the School of Dentistry at the University of Maryland* by Dean John J. Salley; *The Impact of Specialization*

*on the Future of Dentistry* by Joseph F. Volker, D.D.S., M.S., Ph.D.; *Dentistry in the Modern State University* by Wilson H. Elkins, B.A., M.A., B.Litt., D.Phil.; and *Clinical and Electromyographic Research on Occlusion* by Sigvard Ramfjord, L.D.S., M.S., Ph.D.

The varied social events which included breakfasts, luncheons and suppers were climaxed by a Banquet at which The Honorable J. Millard Tawes, Governor of Maryland, was the principal speaker. Below is a congratulatory letter from President Lyndon B. Johnson read by Dean Salley at the Banquet.

THE WHITE HOUSE

WASHINGTON

February 26, 1965

I am pleased to extend my greetings to the Baltimore College of Dental Surgery on the occasion of the 125th anniversary of its founding.

More than a century of notable work in dental education and research is an achievement of great significance to the health progress of our nation. The prevention and control of dental diseases is a task that demands the exemplary sacrifice and devotion which your institution has shown throughout its long and unique history.

I congratulate you for your many achievements and wish you continued success in your important work.



## Faculty Activities at a Glance

An image of the vitality and intellectual dimension of a faculty can no longer mirror solely the caliber of its product, rather it must further reflect the faculty's ability to continue to mature and to contribute significantly to areas beyond the educational environment which it constitutes. That ours is a vibrant instructional community is attested to by the numerous meetings, workshops, clinics, etc., which the faculty attends. Since a log of these activities would include most of the teaching staff and would occupy most of this volume, expediency dictates that only active contributions be reported here.

Dr. Irving I. Abramson, Associate Professor of Oral Medicine, in addition to participating in a radio broadcast on "What is Endodontics?" and a workshop on "Enhancing the Image of Dentistry", presented two table clinics "Diagnostic Aids" and "Aids in Patient Education" and a Continuing Education Course on "Surgical Endodontics" with Dr. J. Philip Norris.

Dr. Charles E. Barr, Coordinator of Clinical Sciences, presented a paper on "Projected New Curriculum" before the Gorgas Odontological Society in Baltimore.

Dr. Sue-ning C. Barry, Assistant Professor of Histology and Embryology, participated in three one-week sessions of the Institute for Advanced Education in Dental Research which were variously held in Minneapolis, Minn., Tucson, Arizona, and Washington, D. C.

Dr. Samuel H. Bryant, Assistant Professor of Oral Diagnosis and Radiology, is Chairman-Elect of the Mary-

land Section of the American College of Dentists as of the December 1964 meeting.

Dr. Joseph P. Cappuccio, Associate Professor of Oral Surgery, has been variously elected President of the Phi Chapter, Omicron Kappa Upsilon, Vice-President of the Middle Atlantic Society of Oral Surgeons and delegate from the Maryland State Dental Association to the American Dental Association (3 year term). Dr. Cappuccio has further served as moderator of a panel on "Middle Face Fractures" and has participated in the workshop on "Enhancing the Image of Dentistry" which was sponsored by the American College of Dentists. Three papers were also presented: "The Management of Oral Surgery Problems in Dental Practice", "Problems of Oral Surgery in Dental Practice" and "Medicare with Emphasis on King-Anderson Bill".

Dr. Jerome S. Cullen, Assistant Professor of Orthodontics, served as Program Chairman for the meeting of the Middle Atlantic Society of Orthodontists held in Washington, D. C., January of this year.

Dr. Edward C. Dobbs, Professor of Pharmacology, has been reappointed as a member of the Nutritional Committee of the American National Red Cross. He has also presented a paper on "The Four Basic Foods".

Dr. Paul A. Deems, Instructor in Orthodontics, has been elected Secretary-Treasurer of the Middle Atlantic Society of Orthodontists for a 3-year term.

Dr. Frank A. Dolle, Assistant Professor of Pharmacology, read a paper on the "Management and Philosophy



of Practice" before the Gorgas Odontological Society in Baltimore.

Mr. Gardner P. H. Foley, Professor of Dental Literature, has been appointed Chairman of the Brenner Award Contest of the American Association of the History of Dentistry and of the Committee on Undergraduate Writing of the American Association of Dental Editors. He prepared a display, "Shakespeare and Dentistry" for the American Dental Association meeting in San Francisco. Among the papers which Professor Foley presented are: "Undergraduate Writing" and "Shakespeare and Dentistry".

Dr. William E. Hahn, Professor of Anatomy, has been appointed as a consultant to the Council on Dental Education. He has also been elected a member of the Committee on Dental Aptitude Testing and on Test Construction for the National Board Examinations.

Dr. Lawrence F. Halpert, Assistant Professor of Oral Medicine, presented a table clinic on "Splinting" before the Baltimore City Dental Society.

Dr. McDonald K. Hamilton, Assistant Professor of Oral Surgery, has participated in a closed circuit television program on "Maxillo-Facial Surgery" at the San Francisco meeting of the American Dental Association. He has also delivered a paper on "The Surgical Aspects of Oral Exfoliative Cytology".

Dr. Dean C. Johnson, Instructor in Removable Prosthodontics, has been on leave of absence for the past year to pursue graduate work in dental materials and fixed prosthodontics at the School of Dentistry, Indiana University.

Dr. Francis J. Kihn, Assistant Professor of Pedodontics, presented a table clinic on "Formocresol Pulpotomy Technic".

Dr. William Kress, Assistant Professor of Orthodontics, at the January meeting of the Middle Atlantic Society of Orthodontists in Washington, D. C., was elected president.

Dr. Barry S. Lever, Assistant Professor of Oral Medicine, presented a table clinic on "Radiograph and Periodontal Disease". He collaborated with Dr. Philip Norris in the presentation of a paper, "The Combined Periodontic-Endodontic Problem" before the Eastern Shore Dental Association.

Dr. Martin Lunin, Professor of Pathology, who was elected Fellow in the American Association for the Advancement of Science, has presented two papers, "Oral Exfoliative Cytology" and "Early Diagnosis of Oral Cancer". At the American Dental Association Meeting, Dr. Lunin participated in the closed circuit television program "Maxillo-Facial Surgery".

Dr. José E. Medina, Assistant Dean, presented a series of lectures and registered clinics before the VII Congress of the Federacion Odontológica de Centro América y Panamá which was held in Guatemala City. Other lectures and papers which were delivered include "Amalgam Restorations", before the 4th and 5th Dental Societies of North Carolina State Dental Association and the Academy of Dentistry, Toronto; "Prevention of Amalgam Failures" in New York, and "The Development of the New Dental Building" in Rhode Island. Dr. Medina presided at or directed The George M. Hollenback Operative Dentistry Seminar (W. Va.), The New England Study Club of Dentistry (R. I., and Mass.) and the Interim Meeting of the American Academy of Gold Foil Operators (Minn.). In addition to being installed President of the American Gold Foil Operators, Dr. Medina was elected Fellow in the



American Association for the Advancement of Science. At the Alumni Breakfast in San Francisco, he discussed the proposed new dental curriculum and building. Dr. Medina also presented a three-day continuing education course in Operative Dentistry which was sponsored by the Florida State Dental Association.

Dr. Jack C. Morris, Assistant Professor of Removable Prosthodontics, presented a paper on "Denture Esthetics" before the Carroll County Dental Society in Westminster.

Our congratulations to Dr. Frank W. Nelson, Clinical Associate, Department of Removable Prosthodontics, who was elected a Fellow in the American College of Dentists.

Dr. J. Philip Norris, Assistant Professor of Oral Medicine, collaborated with Dr. Francis A. Veltre in the presentation of a table clinic on "Restoration of Endodontically Treated Teeth" (Western Shore Dental Society), with Dr. Irving Abramson in a continuing education course on "Surgical Endodontics" and with Dr. Barry S. Lever in "The Combined Periodontic-Endodontic Problem".

Dr. Ernest B. Nuttall, Professor of Fixed Prosthodontics, presided as Chairman of the Partial Prosthodontics Section of the American Dental Association and participated in a closed circuit television program on "Conservative Abutment Preparations in Partial Prosthodontics" in San Francisco.

Dr. George W. Piavis, Associate Professor of Anatomy, lectured on "Sea Lamprey Embryology" at Western Maryland College.

Dr. Kyrle W. Preis, Professor of Orthodontics, who was appointed Chairman of the Education Committee

of the Middle Atlantic Society of Orthodontists, has presented three papers to various social and educational groups: "Childhood Habits Which May Affect Facial Development and Dental Function", "Childhood Dental Problems" and "Childhood Development from a Dental Aspect".

Dr. Charles T. Pridgeon, Associate Professor of Oral Medicine, has engaged in such activities as a radio broadcast, "What is Periodontics?", has presented a table clinic on "Clinical Photography", has served as a discussant for "Current Concepts of Periodontal Therapy", was special lecturer in the continuing education course on "Surgical Endodontics", has presided at the meeting of the Baltimore Society of Periodontology and has been appointed to the Board of Directors of the Baltimore Criminal Justice Commission.

Dr. Wilbur O. Ramsey, Professor of Removable Prosthodontics, at the meetings of the American Dental Association in San Francisco, participated in a closed circuit television program on "Maxillo-Facial Surgery" and presented a paper on "Emotional Factors Influencing Prosthodontic Service."

Dr. Norton M. Ross, Associate Professor of Pharmacology, presented two papers to various Baltimore groups: "Use and Abuse of Drugs for Children" and "Antibiotic Therapy".

Dr. Myron H. Sachs, Assistant Professor of Anatomy, presented a table clinic before the Baltimore City Dental Society.

Dr. John J. Salley, Dean, has been appointed to the Dean's Committee of the Veterans Administration Hospital, Baltimore, to the Committee on Teaching Preventive Dentistry and Community Health of the American Public



Health Association and to the Executive Committee of the University of Maryland Senate. In connection with his administrative position and membership to the Dental Study Section of the National Institutes of Health, Dr. Salley has attended numerous conferences, meetings, project site visits and workshops. Among the diverse subjects about which Dr. Salley has lectured to the various dental, educational, social and fraternal groups are: "Trends in Dental Education", Frederick, Md.; "Dental Identification in Mass Disaster", Charlotte, N. C.; "Development of Baltimore Campus", Baltimore; "Diagnosis and Pathology of Mucosal Lesions", Washington, D. C.; "Forensic Dentistry", Washington, D. C.; "Development of Dental School", Newark, N. J.; "Development of the New Dental Building", Salisbury and Baltimore, Md.; "Dental Health—A National Liability or National Asset", Baltimore; "The Role of the Dentist in Management of Oral Cancer", Washington, D. C.; "Basic Sciences in Dental Education", Gainesville, Fla.; "Oral Cancer", Salisbury, Md.; "Report of the Dental School", College Park, Md.; and "Experimental Carcinogenesis", Richmond, Va.

Dr. Douglas Sanders, Professor of Pedodontics, participated in a radio broadcast on "What is Pedodontics?"

Dr. D. Robert Swinehart, Assistant Professor of Orthodontics, has been elected Historian of the Middle Atlantic Society of Orthodontists.

Dr. Joseph H. Seipp, Instructor in Histology and Embryology, has read papers on various phases of orthodontics before the Graduate Department of Orthodontics, Georgetown University and the Pediatric Staff of Union Memorial Hospital. The topic of "Pub-

lic Relations" was presented before the Maryland State Dental Association, the Suburban Study Club and the Medical and Chirurgical Faculty of the State of Maryland.

Dr. Rodger F. Sisca, Instructor, Operative Dentistry, presented a paper before the Parents of Twins Club, Baltimore, on Genetics and Multiple Births.

Mr. Philip Szczepanski of the Visual Education Department presented a paper on "Histological Illustrator" and has been elected President of the Maryland Industrial Photographic Association.

Dr. Fred Tegtmeier, Associate Professor of Fixed Partial Prosthodontics, read a paper on "Clinical and Technical Aspects of Dental Ceramics and Plastics" before the Northwestern District Dental Society, Greenville, Mississippi.

Dr. Francis A. Veltre, Assistant Professor of Operative Dentistry, collaborated with Dr. J. Philip Norris in the presentation of a Table Clinic on "Restoration of Endodontically Treated Teeth" before the Western Shore Dental Society in Annapolis.

Dr. John I. White, Professor of Physiology, read a paper on "Excitation-Contraction Coupling in Muscle" before the Neurology Grand Rounds Staff of the University Hospital.

Dr. Riley S. Williamson, Professor of Restorative Dentistry, presented a paper, "Construction of Temporary Restorations", and a table clinic, "Construction of a Fixed Prosthesis" before the Baltimore City and County Dental Societies, respectively.

Dr. George A. Zurkow, Clinical Associate in Oral Medicine, delivered a paper on "Principles of Endodontics".



## Faculty Appointments

Dean John J. Salley announces the appointments of William E. Avant, B.A., B.S., D.D.S., (Med. Col. of Va.) to the Department of Removable Prosthodontics; Gretchen H. Bean, B.S., M.S., (Marlboro Col., U. of Vt.) to the Department of Physiology; William K. Collett, B.S., D.D.S., M.S., M.Ph., (U. of Pgh.) to the Departments of Oral Diagnosis and Radiology; David A. Dutton, D.D.S., (U.S.P.H. Hospital) to the Department of Removable Prosthodontics; Lawrence F. Halpert, A.B., D.D.S., (Johns Hopkins, U. of Md.) to the Department of Oral Medicine; Daniel Jacobs, B.S., D.D.S., (U. of Pgh.) to the Department of Oral Medicine; George N. Krywolap, B.S., M.S., Ph.D., (Drexel, Penn State) to the Department of Microbiology; Joseph A. Mead, Jr., A.B., M.D. (Loyola, U. of Md.) to the Department of General Medicine; Jack C. Morris, D.D.S., M.S., (Ohio State) to the Department of Removable Prosthodontics; Jules S. Minker, D.D.S., (Temple) to the Department of Oral Medicine; Frank W. Nelson, D.D.S., (St. Louis) to the Department of Removable Prosthodontics; Jerome F. Peters, B.A., D.D.S., (U. of W. Va., Northwestern U.) to

the Department of Oral Diagnosis and Radiology; David N. Plessett, B.A., D.D.S., (Penn State, Temple) to the Department of Oral Medicine; Lawrence D. Rogers, D.D.S., (U. of Md.) to the Department of Oral Diagnosis; Rodger F. Sisca, B.S., D.D.S., M.S., (U. of Pgh.) to the Department of Operative Dentistry; Sham D. Soman, D.D.S., M.S. (Tufts) to the Department of Removable Prosthodontics; Glenn D. Steele, D.D.S., (U. of Md.) reappointed to the Department of Fixed Prosthodontics; Frank W. Stout, B.S., D.D.S., M.S. (U. of Detroit, Western Reserve U.) to the Department of Pathology; Frederick R. Tegtmeyer, D.D.S., (Loyola of the South) to the Department of Fixed Prosthodontics; Riley S. Williamson, D.D.S., (U. of Md.) to the Department of Restorative Dentistry; Robert M. Zupnik, D.D.S., (Georgetown) to the Department of Oral Medicine; and George A. Zurkow, D.D.S., (U. of Penna.) to the Department of Oral Medicine. A hearty welcome to these new faculty members. May they enjoy a long, productive and happy experience at the Dental School.



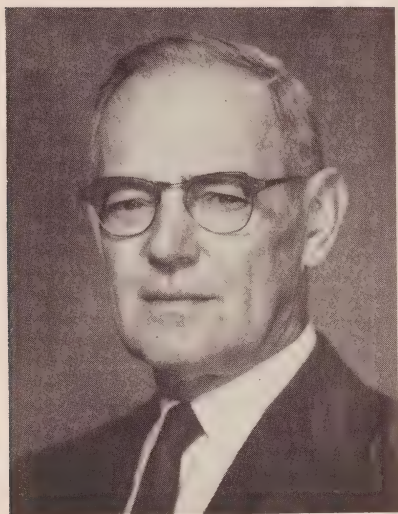
## Publications by Faculty

Among the scientific contributions by the Dental School faculty are:

- COLLETT, W. K.: A procedure for the extraction of calcium-45 from teeth, *J. Dent. Res.* 43 (6), 1964.
- : The effect of fractional x-radiation on dentinogenesis in the rat, *J. Dent. Res.* 44(1), 1965.
- DOBBS, E. C.: The chronological history of local anesthetic drugs, *J. Oral Therap. and Pharm.* April, 1965.
- FOLEY, G. P. H.: The Quarterly Post, *J. Dent. Ed.*, December, 1964.
- : The dentist in literature, *New York J. of Dent.*, December, 1964.
- LUNIN, M.: Coordinate indexing for information retrieval in an oral pathology department, *J. Oral Surg., Oral Med., and Oral Path.* 18(4), 1964.
- NORRIS, J. P., and BECKER, E. F.: A clinical comparison of sulfadimethoxine and penicillin in endodontic management of acute dentoalveolar infection, *J. Dent. Oral Therap. and Pharm.* 1(4), 1965.
- PRIDGEON, C. T.: The dentist, the patient and education, *Alma Mater* 6(1), 1964.
- RAY, J. G., JR., and SHAY, D. E.: Agar-gel precipitin-inhibition technique for C-reactive protein determinations. I. Preliminary evaluation of technique, *Appl. Microbiol.* 13(5), 1965.
- : Agar-gel precipitin-inhibition technique for C-reactive protein determinations. II. Degree of sensitivity and reproducibility, *Appl. Microbiol.* 13(5), 1965.
- SHAY, D. E., and RAY, J. G., JR.: Agar-gel precipitin-inhibition technique for C-reactive protein determinations. III. Quantitation of C-reactive protein in sera specimen, *Appl. Microbiol.* 13(5), 1965.
- SMITH, R., SHAY, D., and DOORENBOS, N.: Relationship of surfactant properties of some synthetic steroids to bacterial action, *J. Pharmacol. Sci.* 53(10), 1964.
- Textbook and chapter contributions by the faculty of the Dental School are as follows:
- DOBBS, E. C.: Care and Handling of Drugs in Pharmacotherapeutics of Oral Disease, (editor) Austin H. Kutscher, New York, McGraw-Hill Book Co., 1964.
- PROVENZA, D. V.: Oral Histology, Inheritance and Development, Philadelphia, J. B. Lippincott, 1964.
- SEIPP, J. H., JR.: The Temporomandibular Joint in Oral Histology, Inheritance and Development, D. V. Provenza, Philadelphia, J. B. Lippincott, 1964.



## In Memoriam



The loss of Dr. Walter Leavenworth Oggesen to the Dental Faculty almost a year ago remains unabated. The sterling qualities of determination, loyalty, sincerity and dedication which were manifested in him at an early age were not merely sustained, but mounted with increasing intensity as the years passed.

Dr. Oggesen, a native of New Haven, Connecticut, attended the Booth's Preparatory School and later matriculated in the Baltimore College of Dental Surgery, Dental School, University of Maryland, from which he was awarded in 1926 the University Gold Medal for Scholarship and the degree, Doctor of Dental Surgery.

In his service to the community as practitioner and Alma Mater as professor, Dr. Oggesen invigorated both. The numerous professional societies in which he was both member and officer, the honors he received and the scientific papers he presented, rightfully earned for him the title—Scholar among Men.

Death was truly cheated of her victory for Dr. Oggesen will live on in the profession and lives which he helped to fashion.



## In Memoriam

Major General Robert Hillard Mills of the Class of 1907 died April 1, 1965, in Washington, D. C. This illustrious son of the Dental School was marked for distinction and honors when as a student he was elected to Omicron Kappa Upsilon and received the Harris Medal for noncohesive gold foil manipulation *Fax mentis incendium gloriae* (The fire of glory is the torch of the mind).

When Dr. Mills entered the Army as Contract Surgeon in 1909, little did he realize that in the years to come he would win the distinction of being the first dentist to be elevated to the rank of Major General. Nor could he have realized the honors such as Fellow in the American College of Dentists, Distinguished Service Medal (U. S. Army 1945), Honorary Alumnus (Northwestern University, Dental School), Honorary Doctor of Science (University of Maryland, 1946) and others too numerous to mention that would be awarded him. Of Major General Robert Hillard Mills it cannot be said: "We have left undone those things which we ought to have done" (Book of Common Prayer).



# TENTATIVE COMMENCEMENT PROGRAM

## WEDNESDAY, JUNE TWO

6:00 p.m. Rolling Road Country Club

OMICRON KAPPA UPSILON (PHI CHAPTER)

Banquet and Convocation

## THURSDAY, JUNE THREE

Student Union Building—Baltimore Campus

8:00 a.m. Past President's Breakfast

8:45 a.m. Registration of Alumni

9:00 a.m. Meeting of the Board of Trustees

10:00 a.m. Annual Business Meeting of Alumni Association

12:00 noon Golf Tournament

Rolling Road Golf Club, Catonsville, Maryland

## REUNIONS FOR CLASSES OF

|      |      |
|------|------|
| 1915 | 1940 |
| 1920 | 1945 |
| 1925 | 1950 |
| 1930 | 1955 |
| 1935 | 1960 |

## FRIDAY, JUNE FOUR

9:30 a.m. Health Sciences Library Auditorium  
Academic and Awards Program

12:00 noon Student Union Building  
Luncheon

1:00 p.m. Open House—Dental School  
(Displays in Departments)

6:00 p.m. Lord Baltimore Hotel  
Cocktails

7:30 p.m. Dinner

10:00 p.m. Dancing

## SATURDAY, JUNE FIVE

Morning Graduation Exercises—College Park, Maryland







UNIVERSITY OF MARYLAND  
BALTIMORE

CIRCULATES AFTER

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JUN 3 1966

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of the

**BALTIMORE COLLEGE OF DENTAL SURGERY  
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***Published by the Faculty***

D. VINCENT PROVENZA, *Editor*

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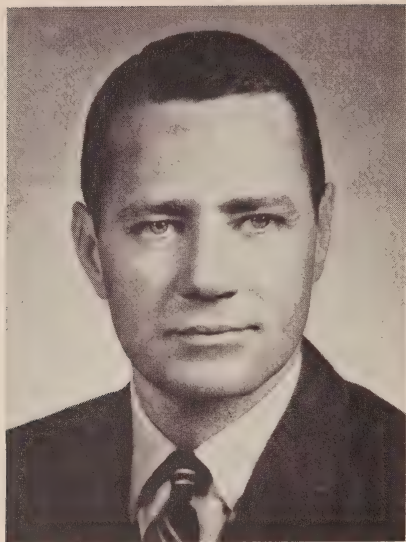
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VOLUME 21

MAY 1966

NUMBER 1





## A Message from Dean Salley

Since the last issue of this Journal and my newsletter of last fall, a great deal has happened at Greene and Lombard Streets.

Perhaps the most exciting news relates to the new building for which your faculty has worked so long and hard. During the 1965 session of the Maryland General Assembly we were appropriated \$275,000 to support the preparation of detailed plans and specifications. This phase of the project has been in progress since July 1, 1965. At this writing, department heads and their staffs are actively engaged in reviewing detailed layouts of areas for which they will be responsible. The entire project is being coordinated by Assistant Dean José E. Medina. As you probably know, detailed planning means that all concerned are now intimately involved in where electrical conduits should be located, what cabinet sizes are necessary in labs, where to find a vacuum system that will handle 256 undergraduate dental cubicles, how rapidly we can move people from the basement to the sixth floor, etc., *ad infinitum!* Hopefully, this will give you some in-





sight into the myriad of details one necessarily becomes involved in with a project of this size and scope.

A most encouraging piece of news was transmitted to us recently when we received notification that the U. S. Public Health Service has provisionally approved our application for the Federal funds for the building. At its November 1965 meeting, the National Advisory Council on Education for Health Professions recommended Federal participation at the level of \$5,257,424. In March of this year the Maryland General Assembly authorized an appropriation of \$3,525,000 as matching funds to initiate construction. An equipment appropriation of approximately 1.7 million dollars will be requested of the State in the next fiscal year. These amounts added to what has been appropriated previously for preliminary planning, site-acquisition, etc., indicate that total project cost will be somewhere around \$11,000,000. All in all, I would report to you that the prospects for the new building are quite favorable and we are in hopes of breaking ground in the spring of 1967.

In November 1965, the University Board of Regents approved the elevations for the new building. The architect's rendering of this magnificent structure is pictured on this page.

In closing, I would like to take this opportunity to invite each and every one of you to return to Baltimore to help us in the celebration of 1966 June Week. Festivities will begin on Wednesday June 1 and will be climaxed on Saturday morning, June 4, when degrees will be conferred by President Elkins at College Park. The Dental School will hold its annual Honors Convocation at 9:30 a.m. on Friday June 3 in the auditorium of the Health Sciences Library. We will be fortunate to have as our speaker this year, Dr. Viron L. Diefenbach, former deputy chief of the Division of Dental Health, U.S.P.H.S., who has recently been appointed Assistant Surgeon General and Chief of the Division.



# 1966-1967 Continuing Education Courses to be Presented at the University of Maryland School of Dentistry

(ALL DATES ARE TENTATIVE)

| <i>SUBJECT OF COURSE</i>  | <i>TENTATIVE DATE</i>             |
|---|-----------------------------------|
| Oral Surgery in a General Practice  | July 20, 1966                     |
| Removable Partial Denture Therapy   | October thru<br>May—2nd Wednesday |
| Oral Diagnosis and Coordinated Treatment<br>Planning for Total Patient Care | October 20, 1966                  |
| Management of Cardiovascular Patients<br>in the Dental Office               | November 10, 1966                 |
| Dental Photography  | December 1, 1966                  |
| Concepts of Occlusion and Clinical<br>Application in Health and Disease     | January 18, 1967                  |
| Complete Denture Service in the General<br>Practice of Dentistry            | February 16, 1967                 |
| Basic Periodontics for the Practitioner                                     | April 7-8, 1967                   |
| Operative Dentistry I   | April 19, 1967                    |
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# Elastic Fibers in the Human Soft Palate\*

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## INTRODUCTION

A histologic description of the soft palate, both of the oral and nasal aspects, has traditionally included an elastic lamina which lies interjacent to the lamina propria and submucosa. Accordingly, this layer of elastic tissue topographically occupies the position of the *muscularis mucosa* in other organs. Because of the proximal relation of the elastic laminae to the glandular elements which in the nasal tissue are found in the lamina propria and in the oral tissue are found in the submucosa, the elastic layer has been designated as the infraglandular and supraglandular elastic laminae respectively. The presence of this layer, which is probably based upon an earlier report of Schumacher<sup>1</sup> has been perpetuated in most recent descriptions<sup>2-11</sup> and has been variously used to delineate

the lamina propria from the submucosa in the soft palate.

## MATERIALS AND METHODS

Human palates which were obtained at autopsy were fixed in neutral buffered formalin for periods of 3 hours successively at concentrations of 5, 8 and 10 per cent. The tissues were fixed for an additional 48 hours in 10 per cent neutral formalin after which they were washed in running tap water, dehydrated by the usual alcohol series, cleared in xylene and paraffin embedded. Longitudinal and transverse sections were cut at 5  $\mu$  and serially arranged on coded slides except where frozen sections were employed which were cut at 10-15  $\mu$ . The stains employed and the color of the fiber components are indicated in Table I. The gradual fixation technique has been employed since it has been demonstrated that this method decreases tissue distortion<sup>12</sup>. With orcein stained material, frozen sections were cut at 10-15  $\mu$ .

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TABLE I  
STAINS AND COLOR REACTION

| Stain  | Fiber color reaction  |                     | Sectioning Method |
|--|-----------------------|---------------------|-------------------|
|  | Collagen              | Elastic             |                   |
| Aldehyde fuchsin <sup>13</sup>                       | unidentifiable        | deep violet         | paraffin          |
| Orcein <sup>14</sup>                                 | unidentifiable        | dark brown          | frozen            |
| Orcein-Giemsa <sup>15</sup>                          | rose to pinkish brown | dark brown to black | paraffin          |
| Orcinol-New fuchsin <sup>16</sup>                    | unstained             | deep violet         | paraffin          |
| Orcein-Van Gieson <sup>17</sup>                      | red                   | brown               | paraffin          |
| Resorcin fuchsin <sup>18</sup>                       | pink to red           | blue black to black | paraffin          |
| Rinehart <sup>19</sup>                               | red                   | unidentifiable      | paraffin          |
| Verhoeff <sup>20</sup>                               | red                   | blue black to black | paraffin          |
| Peracetic aldehyde fuchsin-halmi (PAF) <sup>21</sup> | yellow                | deep violet         | paraffin          |



## RESULTS

### Oral Aspect

A comprehensive study of the formed intercellular components of the soft palate reveals that elements are of three varieties: reticulum, collagen and elastin. The first is, for the most part, restricted in its location to the membrana propria and the perithelium of the capillaries. The collagen elements appear ubiquitously through all regions of the soft palate. The collagen fibers which are found in the soft tissue between the oral epithelium and the secretory and adipose cells of the palate are organized into bundles of varying caliber which appear to be preferentially oriented. For example, except where interrupted by the lymphocytic infiltrations, the collagen fibers immediately subjacent to the oral epithelium are found to be disposed as a narrow sheet more or less parallel to the free surface conforming to the rete pegs (Fig. 1). The collagen fibers underlying the most superficial layer form an anastomotic network being interlaced with other fiber bundles at the upper and lower levels. While the collagen elements are for the most part homogeneously dense through the lamina propria, in some areas either epithelialward and more often in the deeper connective tissue, the collagenous components are aggregated into heavy massive bundles which veer centralward between the fat aggregations and secretory acini to become intermingled with and intimately associated with the muscular elements (Fig. 2).

Examination of the longitudinal sections of the soft palate extending from the area of junction with the hard palate to the free distal terminal, the uvula, reveals a decided difference in the density of the collagen components in the connective tissue. For example, while the

collagen components are found more or less evenly distributed throughout the subepithelial layer, except for local aggregations, as the uvular area is approached the density of the formed intercellular components is substantially reduced. In this area the tissue appears more diffuse. On the other hand, an increase in the cellular elements associated with the glandular and adipose tissue is noted.

Of particular interest are the elastic elements. The elastic fibers are found to differ in caliber, organization, distribution and orientation relative to the level and (or) the geographic location in the soft palate. In the more anterior region toward the hard-soft palate junction, the elastic fibers are found to extend from the subepithelial connective tissue constituting the papillary layer through the deeper connective tissues to the muscular core of the soft palate. In the substance of the papillary tissue the elastic elements are found as fine branching fibers which form an anastomotic network (Fig. 3). Peripherally, the fibers are disposed preferentially following the contour of the rete pegs. The zone upward of 30 microns immediately below the terminals of pegs is also composed of a network of elastic fibers which is diffuse in its arrangement and duplicates that of the papillae. Subjacent to this area, the elastic elements are organized into bundles which pursue an undulating course through most of the length of the soft palate more or less parallel to the surface. These elastic bundles take the form of fenestrated membranes similar to those of the large afferent vessels which anastomose to join adjacent membranes. As many as 50 such membranes are scattered through the width of the reticular layer of the lamina propria. The distance intervening between adjacent membranes is variable. The deepest laminae divorce themselves



from the central mass and veer towards the deeper tissues with the collagen bundles to encapsulate or partition the groups of secretory acini of the palatal salivary glands (Fig. 4). As the bundles of elastic fibers invade the palatal muscles, the fibers tend to disassociate themselves from the parent bundle to participate in the formation of the perimycium complement. (Fig. 4).

Progressing along the length of the soft palate, concomitant with a diminution in the length of the rete pegs and corresponding decrease in the diminution of the papillae, a decided reduction in the elastic fiber population is observed in the papillary lamina propria. It is interesting to note that in the uvular half of the soft palate, the thickness of the reticular layer of the lamina propria is no longer uniform for with the increased number of salivary glands which locally appear more superficially and with the palatal muscles taking a more surfaceward location, in local areas, the connective tissue diminishes and increases contingent upon the location of these tissues. As a result of the more superficial location of the glandular and muscular constituents, the elastic laminae no longer assume a rectilinear path parallel to the palatal surface, rather they pursue paths avoiding the salivary glands and muscle bundles (Fig. 5). Accordingly, then, they are observed in longitudinal, oblique and transverse sections throughout this area.

As the uvula itself is approached, there is a further reduction of the elastic fibers in the papillary connective tissue with an accompanying concentration of the elastic laminae in the reticular layer. In this region, in the absence of obstructing glandular secretory units, the elastic laminae are arranged into a compact layer simulating a limiting elastic membrane (Fig. 6). In the uvula, how-

ever, this organization is lost and the fibrous bundles are observed to course irregularly through the tissue encapsulating the glandular masses (Fig. 7). At the uvular terminal, except for a few scattered bundles, the elastic components are found as individual fibers which are substantially reduced in number.

#### *Nasal Aspect*

Expectedly, immediately underlying the nasal epithelium which contingent upon the functional demands of the area can be composed of either pseudostriated ciliated columnar epithelium with goblet cells or stratified squamous epithelium is to be found the membrana propria. This layer of reticulum which, for the most part, is quantitatively greater than that of the oral mucosa, demonstrates wide variation in depth along the nasal aspect of the soft palate. (Figs. 9, 10 and 11).

The collagen fibers are more commonly arranged in bundles (Fig. 9) and while they are found in great numbers, they do not attain the density characteristic of the oral mucosa. The orientation of the collagenous elements in the proximal half of the soft palate is such that in most areas they are arranged in three layers: upper, middle and lower. The upper and lower zones are more or less rectilinearly disposed while the intermediate zones courses obliquely to combine with the adjacent layers (Fig. 9). The rectilinear layers are *in toto* substantially wider than the intermediate layer which contain a greater number of the larger vascular channels. At varying intervals the fibrous elements of the deepest layer of the lamina propria disassociate themselves from the principal collagenous mass and course towards the more central area surrounding the patches of fat cells and muscle bundles. Initially they are quite dense, however, as they



progress more deeply they anastomose into smaller bundles to eventually merge imperceptibly with those originating from the oral lamina propria. It is interesting to note that hard palateward the salivary acini are very sparse and often absent. As the midpoint of the soft palate is approached, however, the appearance of the salivary elements are observed with increased frequency. In the uvular or terminal area, they form in depth a solid mass extending from the oral to the nasal aspects (Fig. 12). With the appearance of the glandular aggregations the arrangements of the fibrous elements become irregular as described for the oral aspect.

Hard palateward, in the areas devoid of the glandular elements, isolated strands of muscle become intermingled with the larger aggregations of the formed intercellular structures.

For the most part, the elastic fibers in the nasal mucosa are substantially fewer than those of the oral tissues irrespective of their location along the length of the soft palate. In the superficial layer of the lamina propria near the proximal  $\frac{1}{3}$  of the palate, the elastic elements are reduced to a few individual fibers heterogeneously scattered throughout the collagenous elements. More deeply they are collected into bundles which do not demonstrate special orientation. On the other hand, in that part of the lamina propria which is located midway between the uvular terminal and the hard palate, an increased number of elastic fibers is observed immediately subjacent to the connective tissue underlying the basement membrane (Fig. 11). The more superficial elastic fibers not only remain present, but they tend to become more deeply situated until they merge with those of the oral aspect (Figs. 11 and 12). In the uvular process, where the rete pegs and

their complementary papillae are present, the arrangement of the elastic fibers duplicates that found in the oral papillary connective tissue. It is interesting to note that while the more superficially located elastic fibers are found to be a constant feature from the midpoint to the uvular process, the deeper elastic bundles, which are so pronounced and encapsulate the glandular elements of the salivary glands, upon entering the uvula are quickly dissipated and reduced to a few scattered bundles of smaller caliber.

### DISCUSSION

The classic concept of the architectural pattern of the mucosa is one in which the surface epithelium is supported by a membrana propria, an underlying layer of loose fibrous connective tissue, the lamina (tunica) propria, and a thin layer of smooth muscle, the *muscularis mucosae*, which when present delineates the connective tissue of the mucosa from that of the submucosa<sup>22</sup>. In the absence of a limiting muscular membrane, the connective tissue subjacent to the epithelium merges imperceptibly with that more deeply situated so that the distinction between two connective tissue strata cannot be made. Arbitrary classification on the basis of differences in density is invalid since this feature is often local and varies not only from organ to organ in the same individual but even with a given organ.

In the oral cavity the indiscriminate use of the terms lamina propria and submucosa relative to the various regions of the oral vestibule and oral cavity proper except for the soft palate has been based on convention since a *muscularis mucosae* is completely wanting<sup>1-11</sup>. On the other hand, in the soft palate, both in the oral and nasal aspects, a limiting



membrane of elastic laminae has been described which is positionally related to the *muscularis mucosae* and which, accordingly, has been used to delineate the mucosa from the submucosa<sup>1,11</sup>. On the oral side this has been called the *supraglandular elastic lamina* and on the nasal aspect the *sub- or infraglandular elastic laminae*. Thus, the glandular acini are orally located in the submucosa, and nasally in the lamina propria. Since the secretory units as well as fat aggregates are variable in their location, these components cannot be validly accepted criteria for differentiating between connective tissue strata.

The present study demonstrates that the elastic elements of the soft palate are located generally through the oral and nasal connective tissue and intercommunicate in the central muscular core. In only one specific area approaching the uvular tissue were the elastic fibers organized into what might be interpreted as a definite elastic lamina. It is quite possible that the sections from which the original observations were made were taken from this area<sup>1</sup>. The ubiquitous location of elastic elements, both in the oral tissue investigated as well as in others, tempts one to conclude that delineation of connective tissue into lamina propria and submucosa should be based on more histologically sound criteria. Hence, it should be restricted to those areas in which separation is effected by the presence of a *muscularis mucosae*.

#### SUMMARY

A comprehensive study of the elastic components of the soft palate reveals that a definite difference exists in the size, organization, distribution and orientation of the fibers relative to the level and (or) their geographic location in the soft palate. In the more anterior region,

the topographical distribution of the fibers ranges from the *membrana propria* of the oral mucosa to that of the nasal mucosa. Accordingly then, an organized layer or lamina does not exist. As the uvular region is approached there is a sharp diminution of fibers in the papillary connective tissue with concomitant concentration of fibers in the reticular layer. The fibers which in this area are organized into bundles are arranged into sheets. In the uvula, however, this organization is lost and the fiber bundles are again observed to course irregularly through the tissue encapsulating the glandular masses. The orientation and distribution of the fibers on the nasal aspect are similar to those on the corresponding level and location on the oral side.

On the basis of this study elastic laminae do not occur *per se* and if the distinction between a lamina propria and submucosa is made on the basis of a separating elastic lamina, it is warranted neither in the soft palate nor elsewhere in the oral cavity.

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#### LEGEND FOR FIGURES

- FIG. 1—Oral aspect of soft palate showing rete pegs (RP) and papilla (P). Note that the basement membrane (b) is very narrow. The elastic fibers (arrows) course into the papilla. Orcein-Giemsa stain, original magnification x 430.
- FIG. 2—Oral aspect of soft palate. Basement membrane is not visible at this magnification. Collagen fibers (c) course as sheets or bundles parallel to the surface. In the basal layer of the subepithelial connective tissue, the collagen fibers divorce themselves from the parent group to dip into the deeper tissue partitioning the fat aggregations (F) and glandular masses (GA). Rinehart stain, original magnification x 35.
- FIG. 3—Oral aspect of soft palate near hard-soft palate junction. The elastic fibers (EF) are irregularly oriented in the papillary layer of the lamina propria and invade the papillae for varying distances, forming an anastomosing network (arrow). In the reticular layer the elastic fibers are aggregated into bundles (EB) and course irregularly along the length often forming relatively thick sheets. Aldehyde fuchsin stain, original magnification x 35.

FIG. 4—Oral aspect of soft palate (proximal third to hard palate).

Note that the elastic fiber bundles (EB) are found as sheets extending through the subepithelial connective tissue. The most deeply situated elastic fiber bundles (arrows) invade the fat (f) and glandular masses (G) as well as the muscle group (M).

PAF stain, original magnification x 35.

FIG. 5—An area of soft palate in which the palatal glands assume a more superficial location.

Note that the elastic elements (arrows) pursue meandering paths avoiding the glandular masses (G) and are, therefore, seen in longitudinal, oblique and transverse sections. Epithelium (E). Orcein—Giemsa stain, original magnification x 35.

FIG. 6—Oral aspect of soft palate area adjacent to uvular process. In this area the elastic fiber bundles (EB) tend to become concentrated simulating an elastic lamina. Oral epithelium (E), and fat aggregations (F).

PAF stain, original magnification x 35.

FIG. 7—Uvular process of oral aspect of palate. Note that the elastic fiber bundles (EB) simulating a supraglandular elastic lamina, lose their identity, break up into fibers as they encounter the glandular masses (G). Epithelium (E).

Orcein stain, original magnification x 35.

FIG. 8—Uvular process.

In the uvula itself, the elastic fibers (arrows) become heterogeneously scattered throughout the process forming a typical connective tissue component: Epithelium (E), glandular masses (G), ducts (D), muscle (M).

Orcein stain, original magnification x 35.

FIG. 9—Nasal aspect of soft palate showing respiratory epithelium (RE), a pronounced thick basement membrane (BM) and the red collagen fibers (Cr, Co). Glands wanting.

Note that the most superficial and deepest collagen bundles course rectilinearly (Cr) while the intervening take oblique paths (Co). Rinehart stain, original magnification X35.

FIG. 10—Nasal aspect of soft palate.

Note ciliated pseudostratified columnar or respiratory epithelium (RE) and the distinct thick basement membrane (BM). Orcein-Giemsa stain, original magnification x 450.

FIG. 11—Nasal aspect of soft palate.

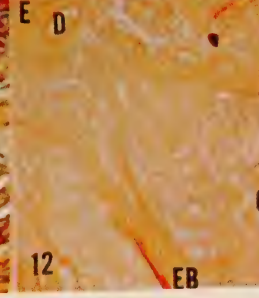
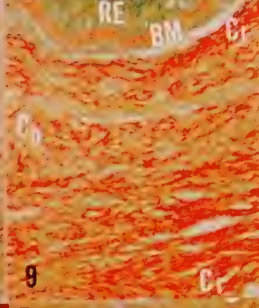
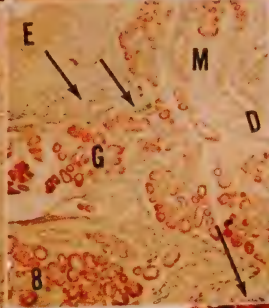
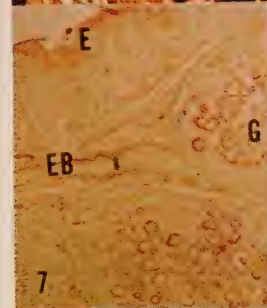
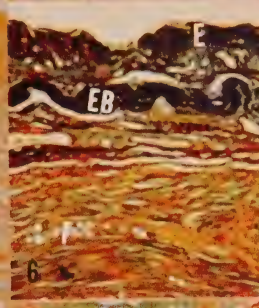
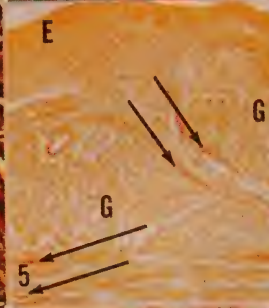
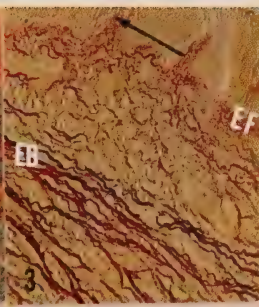
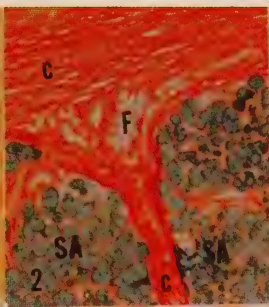
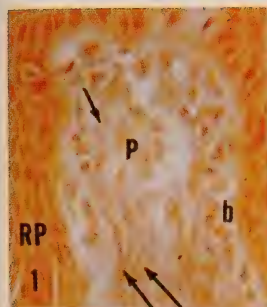
Elastic fibers immediately below basement membrane (BM) form an arborizing plexus (EF). In the deeper connective tissue, the fibers are organized into bundles (EB), a condition which persists to the central muscular layer. Glands wanting.

PAF stain, original magnification x 35.

FIG. 12—Nasal aspect of soft palate. Uvulward where the elastic fibers subjacent to the epithelium (E) are aggregated into bundles (EB), they partition the glandular masses (G). Duct of palatal gland (D).

Orcein-Giemsa stain, original magnification x 35.







# In Vitro Synthesis of Polysaccharides by *Streptococcus Salivarius*\*

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## INTRODUCTION

*Streptococcus salivarius* which has been isolated around and from the dental plaque material (Krasse, 1955; Gibbons, *et al.*, 1963) has been reported to be capable of synthesizing and storing large amounts of polysaccharides (Von Houte, 1964; Niven, *et al.*, 1941; Snyder, *et al.*, 1955).

The objectives of this study are: (1) to test the eligibility of various types of surfaces for *in vitro* deposition of polysaccharide; (2) to determine the precise sugar that is responsible for synthesis and (3) to determine the chemical nature of the deposit.

## MATERIALS AND METHODS

Pure cultures of *Str. salivarius* are grown in Trypticase Medium No. 1 (Barry and Provenza, 1963) for a desired period of time. A 0.1 ml. aliquot of the culture is used as an inoculum into each of the 250 ml. Erlenmeyer flasks prepared in the following manner: 100 ml. of Trypticase Medium No. 1 with the chosen particles (freshly extracted tooth, frogs femur bone, a glass marble, and a porcelain chip). The flasks are subsequently incubated at 37° C. The medium is replaced very 24 hours and the purity of the culture is checked with the mitis-salivarius agar plate and tests prescribed in Bergey's manual (Breed, *et al.*, 1957).

In the second series of flasks, the

sucrose in the medium is replaced by glucose, or by maltose, or by the combination of glucose and fructose or by fructose alone.

The gelatinous deposit is then removed and subjected to colorimetric analysis (Kulka, 1956).

## RESULTS

A total of 4 weeks incubation was observed. At the end of the third day, a noticeable amount of accumulation occurred on the tooth surface (in flasks with sucrose as the sole sugar source). At the end of a week, the accumulation was rather heavy on the tooth surface and began to show on the bone surface also. Throughout the incubation period, no deposition was ever observed on either the marble or the porcelain surfaces; nor was there any deposition on tooth and bone when other sugars replaced sucrose in the medium (Figs. 1-4).

Chemical analyses indicated that the basic units of the deposit are ketohexoses and the deposits are highly PAS positive.

## DISCUSSION

Gibbons and Socransky (1962) reported that among the microbial flora encountered in dental plaque, streptococci not only formed a large amount of polysaccharide but they were also capable of metabolizing it when the environmental carbohydrate was depleted. Thus, they could produce acid for extended periods of time in localized area. The authors suggested that this property may be closely related to dental caries. Krasse (1965) showed that a hamster strain streptococcus was capable of synthesizing

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Fig. 1. Medium glucose only.



Fig. 2. Medium of glucose and fructose.



Fig. 3. Medium fructose only.



Fig. 4. Medium sucrose only.

a gelatinous material which adhered to the tooth surface *in vivo* in the presence of sucrose. The deposit failed to form in the presence of glucose. Our results not only agreed with those of Krasse's, but in addition, demonstrated that even in equal molar concentration of glucose and fructose *Str. salivarius* failed to form adhering substances. It is possible that something other than the monomer of fructose is needed for the synthesis of this particular form of polysaccharide. Currently, we are studying the factors affecting the accumulation of this material and the chemical nature of the breakdown products.

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# Biopsy and Cytodiagnosis in Dental Practice\*

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## INTRODUCTION

A careful, thorough examination and a detailed history are sometimes all that are required to diagnose a lesion. There are circumstances, however, that make it difficult or even impossible to establish the true diagnosis without further aid.

Because of such difficulty, many laboratory tests have been carefully worked out over the years. Radiographs and chemical, immunologic, bacteriologic, and other tests have been devised to help the clinician recognize the disease process he will treat. Two of the tests commonly used in diagnosing oral lesions are biopsy and cytodiagnosis (exfoliative cytology).

In biopsy, tissues are removed from a living patient for histological examination. A conclusive diagnosis can often be made in this manner.

In cytodiagnosis, superficial cells from an area in question are examined microscopically for variations that indicate a specific disease process. This test is most often used as a preliminary screening device to detect potentially cancerous lesions.

## BIOPSY

### The Uses of the Biopsy

The biopsy is not foolproof, surefire, nor is it all powerful. Nevertheless, despite its limitations, it continues to be the dentist's most valuable laboratory test. It is usually a simple, safe procedure requiring a simple armamentarium and is within the capability of every dentist.

The biopsy has many uses. Its first and most frequent use is in *diagnosis*. A biopsy is an absolute necessity in establishing a diagnosis of neoplasia. It can be used for the diagnosis of non-neoplastic lesions such as pyogenic granuloma, chronic inflammation, fissural cysts and many others.

The biopsy is also extremely useful in determining the *degree of invasion or the extent of a lesion*. Histologic examination can also show whether the lesion has been completely removed. Many lesions, including non-neoplastic lesions, have a tendency to recur when incompletely removed, and the pathologist's report can help the clinician anticipate the possibility of recurrence.

The histologic examination of the biopsy specimen usually discloses the *predominant cell type* of the lesion. This is especially useful in neoplasms. When the cell type is known, it is often possible to plan better treatment. For example, it is important to know whether a skin lesion is squamous cell carcinoma or basal cell carcinoma. Both are invasive, but the latter rarely metastasizes. Sometimes it is also useful to know to what degree the cells of the tumor are radiosensitive. Such information helps decide whether treatment will be by surgery or radiation.

In summary, the biopsy is useful:

1. to diagnose the disease process.
2. to observe the extent or degree of invasion of the lesion.
3. to recognize the cell type of neoplasia, thereby enabling more precise prediction of the course of the disease and planning for sound treatment.

\*This work was supported in part by the PHS Grant CA882-16 from the National Cancer Institute.



When the biopsy is properly executed, the real benefits far outnumber the potential disadvantages (to be discussed later). In addition, most oral lesions are readily accessible. For these reasons it may be said that in the case of undiagnosed lesions of the mouth the biopsy is seldom, if ever, contraindicated.

### Examples of the Usefulness of a Biopsy

#### *Case I*

A 65-year-old-man, when reporting to his dentist for a regular 6-month check-up of his teeth, told his dentist that he had bitten his tongue three weeks before. Although it was no longer as painful as it had been, he still complained of some discomfort. The lesion was on the lateral border of the tongue. It was ulcerated with a firm, rolled, raised margin.

The chief diagnostic problem here was to establish whether this was a secondarily infected traumatic lesion or a carcinoma. The clinical appearance and the history fitted both conditions. The biopsy revealed that this was an inflammatory lesion, and treatment with antibiotics provided a cure.

#### *Case II*

A routine dental examination of an elderly man revealed generalized severe periodontal disease, root fragments, and fistulous tracts. An incidental finding was an indurated inflammatory lesion on the skin of the face in the midline approximately overlying the level of the apices of the lower central incisors. The tentative diagnosis was a fistulous tract, but when examination failed to reveal a logical source of infection the lesion was excised and submitted for histologic examination. The lesion was found to be a basal cell carcinoma.

In both these cases the biopsy solved a diagnostic problem and, in addition, per-

mitted early treatment. Both of these factors are important. Early diagnosis and treatment mean a better chance for a cure.

The use of the biopsy enables the dentist to make an early diagnosis and to institute treatment before the disease process can become more advanced. In cancer of the mouth, the survival rate of patients treated early is significantly better than the survival of those whose diagnosis and treatment are delayed.

### Indications for Biopsy

Biopsy is indicated whenever a lesion is suspected of being neoplastic. As a rule of thumb one might say that lesions that have not healed in 2 to 3 weeks should be suspected of being neoplastic and should be submitted to biopsy.

Biopsy is also indicated for any lesion for which a diagnosis has not been established.

In addition to tissue removed for diagnostic purposes (biopsy), good surgical practice demands that all tissues removed in treatment of disease (surgical specimens) be submitted for histologic examination. Important lesions are seldom discovered in this way, but it is a worthwhile procedure even if only one life is saved in a professional lifetime.

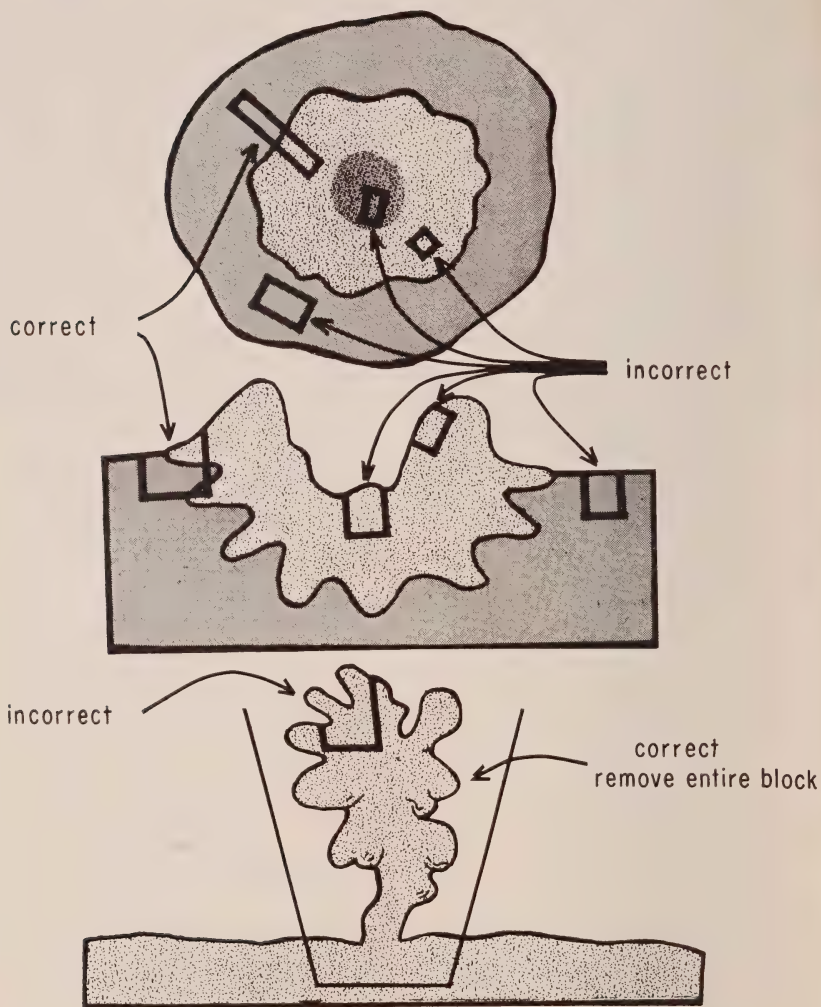
### Contraindications or Dangers of Biopsy

There are no practical dangers in the biopsy. The theoretical dangers are based on the possibility of opening blood channels through which tumor cells can metastasize. It is interesting that many authorities have pointed out the following two facts:

1. The alternative to biopsy is either to treat in ignorance or to leave the patient to his fate.
2. The biopsy is probably less harmful than rough handling or massage of the lesion by the patient.



# BIOPSY TECHNIQUE



adapted from Dr. H. C. Hopps



The biopsy is a surgical procedure and the precautions taken for other operations should also apply here.

### Biopsy Technic (Fig. 1)

It is extremely important that the pathologist receive detailed information concerning the lesion. One of the limitations of the biopsy lies in the relatively restricted information that is often supplied to the pathologist. Aside from name, age, date, and sex, the pathologist should know the exact location of the lesion, its size and clinical appearance, its duration, and the results of previous tests and treatment. Radiographs should always accompany biopsies of bone lesions.

In preparing the tissues, avoid using strong or highly colored disinfectants because they cause distortion. In addition, never inject anesthetic directly into the lesion. The most useful method for obtaining tissue in oral lesions is surgical removal with a scalpel. While electrocautery, needle biopsies, and punch biopsies are often used, they usually do not give good results with oral lesions.

Excise small lesions completely. If they can heal by primary intention, large lesions should also be excised completely. This technique is called *excisional biopsy*. Make the lines of excision in normal tissues.

Large lesions and some diffuse lesions should be biopsied by removing a portion of the lesion. The tissue removed should include the active part of the lesion as well as some of the surrounding normal tissue. This type of biopsy is called an *incisional biopsy*.

In both types of biopsy, the tissue should be handled gently without tearing and without excessive forceps pressure. Non-serrated forceps are preferred.

Immediately following removal, the

tissue should be washed for a few seconds in running water to remove the blood resulting from surgery and then dropped in 10% formalin. Use wide mouth bottles so that the specimen can be removed without crushing or distorting the tissues. The formalin should be fresh since old formalin is often too acidic. The volume of formalin should be approximately 20 times the volume of the specimen. The centers of very large specimens will fix poorly and, therefore, a large specimen should be divided into 2 or even 3 pieces. Small specimens will fix in 24 hours, but large specimens may need 3 days.

The specimen can be sent to the pathologist as soon as desired after the operation. In oral lesions, there is usually no need for the rapid frozen section technic.

Once in the pathology laboratory, the tissue is rinsed, dehydrated, cleared, infiltrated with paraffin, embedded, and sectioned. The sections are then mounted on slides, stained, dehydrated again, and covered with cover slips. They are then ready for examination by the pathologist.

The diagnosis is a simple, clear-cut matter in most cases but not in all. The pathologist is concerned with studying a biological phenomenon, and borderline cases do exist. It is sometimes not possible to decide whether a lesion is truly malignant. Some non-neoplastic diseases mimic malignant tumors. Some malignant tumors, notably chondrosarcomas, may appear deceptively benign. The pathologist's report will describe any difficulties in arriving at a conclusive diagnosis. Recommendations for precautions or follow-up measures may also be appended to the report.

To interpret the pathologist's report the dentist must be aware of the nomenclature used by the individual pathologist. This is especially true of keratotic



lesions. For example, many pathologists use the term *leukoplakia* but their interpretation of the meaning of the term varies widely.

The significance of a negative biopsy arises frequently. A negative biopsy can mean that no cancer exists in the lesion. It can also mean that the biopsy was taken from the wrong area of a large lesion, that the neoplastic part of the specimen was somehow lost in processing, or missed in sectioning. At any rate, the dentist will occasionally find it necessary to take a second or even a third biopsy before accepting the negative diagnosis. The dentist's clinical judgment must be the deciding factor.

The pathologist's report should not be accepted as the final word but this report should be added to all the other observations, and the dentist should make the final decision of the diagnosis and treatment. This may mean a second biopsy. It may mean that there will be no treatment at all.

The question is often raised, "Who should take the biopsy?" Every dentist should be prepared to take a biopsy. If for some reason he wishes to avoid taking a biopsy, it is his responsibility to advise the patient of the need and to find someone who will do it.

The process of referring the patient to another dentist usually results in delay and in additional expense for the patient. For these reasons, the dentist should be prepared to do all but the most difficult or inaccessible biopsies himself.

The argument that the biopsy should be performed by the individual who will eventually treat the patient has some merit. However, it is important to remember that while cancer is a dangerous disease, it is also uncommon. The diagnosis of most biopsies is not neoplasia, and usually the dentist finds that

he continues the treatment himself. While many surgeons feel that the patient should be referred to them for biopsy, it is a fact that they in turn must often refer the patient to a radiologist. If the biopsy is done promptly and well by the dentist, it will rarely, if ever, interfere with treatment and will most often help to establish an early diagnosis.

To summarize:

1. Prepare yourself to take a biopsy.
2. Take a biopsy of all lesions suspected of being neoplastic.
3. Take a biopsy of all undiagnosed lesions.
4. Excise small lesions.
5. Incise larger lesions.
6. Handle tissues gently.
7. Fix the tissues adequately and promptly.
8. Prepare yourself to understand the report.

## CYTODIAGNOSIS (EXFOLIATIVE CYTOLOGY)

### Introduction

Exfoliative cytology had its origin in that era, 100 years ago, when scientists were still debating whether there were such things as cells. Pioneers in the study of cells wrote descriptions and drew pictures of exfoliated malignant cells. They suggested that the exfoliated cells could be used for the diagnosis of cancer. No accurate, simple techniques were devised, however, until the present era. Work begun in 1923 by Dr. George Papanicolaou resulted in the development of a simple procedure for using exfoliative cells for diagnosis. For many years little was done with the technic, but since the publication in 1948 of his monumental monograph, the diagnostic procedure has found wider and wider



application. The technic depends on the well-known facts that cancer cells often exhibit unusual chemical and morphological changes and that epithelial linings continually exfoliate cells. In Dr. Papanicolaou's technic, the cells are examined microscopically and the skilled observer can make a diagnosis of disease. This technic has been adopted for examination of vaginal smears, sputum, gastric washings, urine, cerebrospinal fluid, and oral smears.

### Uses of Oral Cytodiagnosis

Oral cytodiagnosis is one of the most recent of the cytological examinations derived from Dr. Papanicolaou's original work. It has been suggested that oral cytodiagnosis had a delayed development because oral neoplasms are usually easily visualized and very accessible for biopsy and histopathologic diagnosis. Nevertheless, cytodiagnosis can provide useful and valuable information.

The greatest value of this technic to dentists is its usefulness in providing a means for early diagnosis of oral cancer. Exfoliative cytology provides an easy, painless method for evaluating innocuous, premalignant and early malignant lesions. Most dentists do not make use of exfoliative cytology in any other way, although the technic is extremely useful in helping to evaluate the radiosensitivity of a lesion and in diagnosing residual or recurrent cancer.

The biopsy can also be used for these same purposes, but cytodiagnosis permits a quick, simple method of accomplishing essentially the same end. It must be stressed that cytodiagnosis does *not* replace the biopsy.

### Indications for Cytodiagnosis

It is difficult to define specifically and positively the indications for cytodiagnosis.

The method can be used in almost any circumstance and for any surface lesion. It should be an adjunct to each biopsy. A smear taken just before biopsy will sometimes add valuable information which helps in interpreting the biopsy. Such a case is the innocent appearing lesion where biopsy fails, for one reason or another, to reveal cancer. The scraping of the lesion might add just enough information to indicate that a second biopsy should be taken.

Another indication for cytodiagnosis is to evaluate innocent appearing lesions that do not arouse the degree of suspicion that would indicate a biopsy. Experience with cytodiagnosis has shown that a small but significant percentage of these lesions are malignant.

A study done by the Veterans Administration showed that one-half of the patients were unaware of the lesion that later proved to be cancer. The floor of the mouth, tongue, and oropharynx were the most frequent sites of these innocuous lesions.

Other investigators found that about 6 per cent of a group of ulcers unsuspected of being neoplastic proved to be carcinoma.

It is impossible to say which lesion in what area should arouse the highest index of suspicion. Perhaps every soft tissue lesion should be examined by exfoliative cytology. Remember that the earliest signs of carcinoma are benign in appearance. If you wait for overt signs, you miss all the pre-malignant and early oral neoplasms. In order to find these very early stages, it is necessary to take scrapings of even innocent appearing lesions.

### Contra-indications for Cytodiagnosis

In a strict sense, there are no contra-indications for oral exfoliative cytology. Nevertheless, it is generally agreed that



any lesion suspected of being neoplastic should be biopsied. If the lesion is small and discrete, it should be excised. Scraping and waiting for a cytodiagnosis report simply delays the start of treatment in the "clear-cut cases".

### Taking a Scraping of an Oral Lesion (Fig. 2)

*General Considerations.*—The most common malignancy of the oral cavity is squamous cell carcinoma. In the natural history of this disease, the earliest changes occur in the deeper layers of the epithelium. A useful scraping, therefore, should contain some of these deeper cells. Superficial scrapings usually reveal little of value and result in a high proportion of negative reports. In scraping keratotic lesions, it is frequently difficult to obtain any cells other than superficial scaly cells. The more productive areas are likely to be reddened fissures or thin, reddened areas of the keratotic lesion. Hard, keratinized lesions can be scraped lightly with a curette to expose the deeper cells required for the cytology sample.

Perhaps even more important than the keratotic lesions for the early diagnosis of cancer are the small, unobtrusive, velvety, red lesions. Frequently, these are difficult to see; and often they resemble minor inflammatory lesions. However, scraping from such lesions are probably more valuable than scrapings from keratotic lesions.

### The Scraping Procedure

Although several procedures have been recommended for taking smears, any procedure is adequate if it produces intact cells (including a reasonable number of deeper cells) free from debris and blood. The following is one acceptable technic:

1. The area to be scraped should be wiped free of blood, debris, superficial cells, and bacteria. A gauze patch moistened in normal saline is ideal for this, but any moist gauze patch will do.
2. Scrape the area vigorously to remove cells.  
Scrape the lesion in one direction only. Avoid the production of excess bleeding as it impairs interpretation of the cells. The instrument used may be a Woodson plastic instrument, a curette, a cotton tipped applicator, or a tongue blade.  
*A narrow tongue blade which has been thoroughly moistened in tap water makes an excellent disposable scraper.*
3. Smear the cells as quickly and evenly as possible on "frosted" slides. *The slides should have been prepared previously* by having the patient's name and any other necessary identifying data written at one end on the surface used for smearing the cells. If two lesions from one patient are being examined, slides must indicate the site from which the cells came.
4. *Fix the slide immediately.* Any delay results in distortion of the cells and reduces their value for diagnosis. After the first slide is made, a second should be made of the same lesion. The fixative can be any one of a variety of materials. Kits provided by surgical supply houses contain suitable fixatives if the directions are followed. Ethyl alcohol 95% makes an excellent fixative. The slides should remain in the alcohol for at least one-half hour without agitation. After proper fixation, the slides can be air-dried, wrapped carefully, and sent to the laboratory.

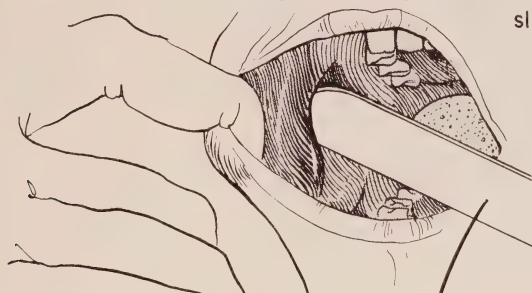
### Important Do's and Don't's

1. Don't mix the cells from one lesion or one patient with cells from another lesion or another patient.

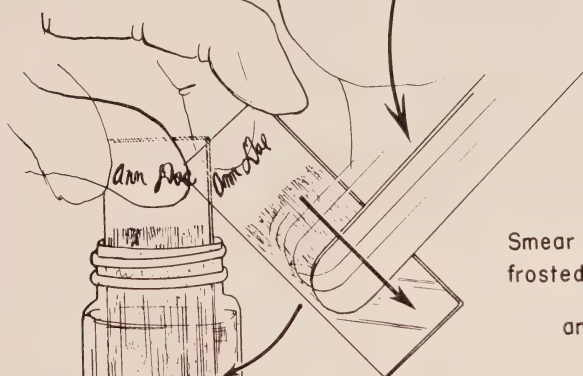


# ORAL CYTOLOGICAL SMEAR

Draw angle lateraly with little finger, holding  
slide with same hand.



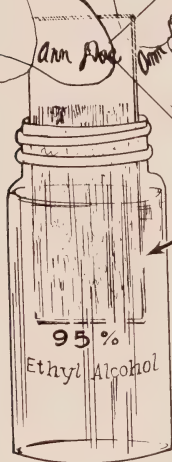
Scrape mucosa  
forward firmly  
several times  
collecting milky  
cellular material



Smear slide on  
frosted surface  
and

IMMEDIATELY drop in fixative

Repeat for several specimens.  
Send to laboratory with  
history description.



from manual by Dr. John K. Frost



2. Use the fixative only once. If you must use it again, filter it carefully.
3. Fix separately the slides from each lesion so no cells can float from one slide and lodge on another slide that has been taken from another lesion or another patient.
4. Discard the tongue blade after it has been used for one lesion.
5. A complete history form should accompany the smears of each lesion.

### The Cytodagnosis Report

It is important for the clinician to understand the significance of the cytodagnosis report. Misuse of the information provided can result in unnecessary tragedy.

Reports are generally in the form of a classification from Class I to Class V. The immediate interpretation is shown below along with the significance in management of the patient.

*Class I*—Normal. All or almost all of the cells on the slide are normal.

*Class II*—Atypical. Not neoplastic—abnormal cells have been seen, but there is no evidence of neoplasia. In these slides, the majority of the cells are normal.

*Class III*—Suspicious of cancer. This is an inconclusive category in which a significant number of cells show changes which are bizarre enough to arouse a suspicion of cancer.

*Class IV*—Probably cancer. In this category, cells which strongly resemble neoplastic cells are seen in significant quantity.

*Class V*—Definitely cancer. In this category, there are very bizarre cells which can only represent malignant change.

In addition to the class, the pathologist will usually add his recommendations. These are intended to help guide the dentist in proper diagnostic procedures.

A Class I diagnosis of a lesion that was

never really considered truly neoplastic by the dentist is usually enough to rule out cancer. Nevertheless, failure of the lesion to respond to treatment may call for a second smear. Another matter is a Class I diagnosis of a lesion which the dentist believed was neoplastic. In these circumstances, an immediate repeat smear is in order. Often, the second or third smear will reveal the true nature of the lesion.

Class II diagnoses are very often regarded in the same manner as the Class I diagnoses. Both are considered *negative for cancer*. It is important to keep in mind that even with three or more negative smears of a lesion, one never completely rules out the possibility of cancer. These diagnoses just mean that there were no recognizable cancer cells on the slide. It does *NOT* mean that the patient is free from neoplastic disease.

Class III reports are the most difficult for the pathologist and the dentist. Repeat smears or biopsy (or both) are mandatory. In oral exfoliative cytology, many lesions originally diagnosed as Class III will turn out to be inflammatory. A significant number, however, will prove by further test to be neoplastic. Efforts should be made to obtain a final diagnosis of Class I or II or Class V. Usually, this can be done by repeat smears, by biopsy, and by following the patient closely.

Class IV and Class V diagnoses demand immediate biopsy. It is well to be prepared to treat the case as soon as the biopsy confirms the diagnosis of neoplastic disease. In a real sense, the Class V diagnosis is the only conclusive diagnosis. All other diagnoses simply express a statement of the condition of cells seen on a slide in a laboratory far removed from the patient. And even the Class V must be confirmed by biopsy.





## Guild of St. Apollonia

The annual Communion Mass of the Baltimore St. Apollonia Society was celebrated in the Basilica of the Assumption by Monsignor Thomas J. Mardaga, Rector. The breakfast speaker was the Very Reverend Joseph A. Sellinger, S.J., President of Loyola College. The text of his speech follows:

### **The Christian Dentist**

Had you told me, when you invited me to address you, that I had exactly one minute for doing so, I still would take the first half of that minute to thank you for the honor your invitation accorded

me. For I consider it a rather special honor, as I believe your guild to be especially admirable.

In the first place, it was the first such Catholic guild in our country and is, therefore, our oldest. Nine years later, in 1929, our Catholic lawyers copied your example and inaugurated their guild. Following them in 1950, came the Catholic Psychiatrists Guild. You, however, are now celebrating your forty-fifth anniversary.

Of these three Catholic Guilds, moreover, yours is the only one whose purpose is a charitable purpose, whose objective



is to help others. Or to put it more concretely, your purpose is to *provide dental care for parochial school children and charitable diocesan institutions.*

Finally, The Guild of Saint Apollonia is the only one of our guilds Catholic enough to have a patron saint—to honor a saint by naming itself in her honor.

Such being the high distinctions of the Guild of Saint Apollonia, it follows that an invitation to address its Baltimore members is likewise a distinction to be regarded with special esteem.

Solely to freshen your memories of your valiant patroness, let me briefly recount how Saint Apollonia suffered her martyrdom. The year, A.D. 248, was the first millennial year of the founding of Rome, which took place in 752 B.C. To celebrate the event, the pagans of Alexandria decided to persecute the Christians. When they had seized Apollonia, not merely a Christian Virgin, but also a voluntary handmaid of the local clergy, known as a deaconess, and had belted out all of her teeth, they dragged her outside the city gates, where an enormous fire was raging. Unless she uttered certain impious words, she was told, she would be cast alive into the flames. She asked for a moment's reflection. Instantly, she shot past her captors and flung herself into the fire.

And this brings me to the main point of my talk this morning. I am not going to speak to you as Christian men, or as Christian husbands and fathers, but precisely in your capacity as Christian dentists. You may not, at first thought, associate the two, Christianity and Dentistry, but they are closely united, and just to prove this fact to you, at a time when, with the second Vatican Council just concluded, we are hearing so much about the Church's role in the contemporary world, I am going to take as my

basic text some remarkable words addressed by the late Pope Pius XII to the first Italian Congress of Stomatology held in Rome on October 25, 1946:

Few people realize the Dentist's mission. Dentistry requires an exact acquaintance of, and experience in, the Sciences and Arts. It demands tact, intuition and psychological finesse in order to acquire the art of persuasion and that moral authority necessary to anticipate and to overcome those instinctive fears and hesitations on the part of the patient, more distracting than actual pain. You need such patience, great physical resistance—You have to sustain a perpetual effort of restraint of all your senses, your nerves are strained, your body, your mind, your will and your sensitiveness. Always standing, often in a constrained attitude, your eyes are strained, both hands are busy, they must be supple with the fingers contracted in the manipulation of several instruments at one time, every movement impeded by reflexes and reactions on the part of the patient, which are not always possible to perceive. And all the time, you must remain imperturbable, calm, courteous, gentle, and full of charity.

The least defect of any of the tissues of the body such as the mucous membrane of the mouth may have repercussions on the rest of the health of the whole.

The mouth expresses character and feeling which is not expressed by forehead and eyes only but also by the lower part of the face; a single fold of the lip, almost imperceptible, often may transform and make an infinite alteration in the expression of the face. Thus, there is a mysterious and surprising mission attaching to the treatment of the mouth.

An American Catholic dentist, Edward J. Ryan, writing in the periodical, *Oral Hygiene* (June, 1947), made the following illuminating commentary on these words of the Holy Father:



"Few people realize the dentist's mission." With these words, Pope Pius XII opened an address before the Italian Dental Association. In the course of the talk, His Holiness showed a marvelous understanding of the complex nature of the dentist's science and his art and the ramifications of his ministrations within the human personality. Coming from one of the most important figures in the world, his words should inspire us with the depth of the understanding expressed. If we had the skill to project these same ideas among the people of the world, the health of mankind would be improved. If we dentists ourselves realized the importance of our mission and were better able to explain our function, people would seek our services more readily and by so doing would improve their own total well-being.

Here we have an expression in clear words, an interpretation of dentistry that encompasses more than mechanics. We must be reminded, time after time, that our mechanical skills are projected upon human tissue and that this tissue is part of a life and personality. The human personality is vested within a person that we call a patient. This person is part stoic and part coward; part sinner and sometimes a small part saint. He has fears and anxieties, as well as rich ideals and bright hopes. He is a variable that must be understood if we are to practice dentistry with satisfaction to him and to ourselves. When we embrace the idea that we treat the localized expressions of a disease that has implications within the total personality, we are then prepared to practice our profession in the broadest sense. When we add to this idea that dentistry is also concerned with esthetic values and that we have within our gift the power to restore and reconstruct faces, we have opened to our view an ideal of dentistry that knows few limitations. To add to human happiness and comfort is our privilege.

Any enlarged comments on the words of the Pope seem presumptuous. We may, however, be forgiven for

making the observation that the dentist must combine the knowledge of science, the applications of the arts, the skills of a fine craftsman, and an understanding of the human personality. We may expect to fulfill our mission only when we blend these abilities and powers and are able to practice them and "Remain imperturbable, calm, courteous, gentle, and full of charity." These can be no better model for the conduct of a dental practice!

In the light of this papal statement and of Dr. Ryan's commentary, any further words from me seem quite unnecessary. I would then conclude by summarizing those qualities needed especially by the Christian dentist of today. First, an ever-updated knowledge of new techniques; second, a sense of tact, intuition and psychological finesse in the handling of the patient; third, the need of great patience based on love for the person before you, seeing in that person Christ Himself; fourth, a realization that you are not just treating a case, a mouth, but a person whole and entire; and finally, the conviction of the service you are daily rendering to the easing of pain and to the betterment of total human health and functioning.

We, your patients, need you, our dentists, just as you, our dentists, need us, your patients. If ever we need a reminder of our need for you, it takes only a dull, throbbing toothache in the middle of the night, but thanks to what you have done and to what you are daily doing, such events have become fewer and fewer, and as we sink our teeth into a good piece of juicy steak, we say a silent but heartfelt prayer to God and to St. Apollonia: "Thanks, God, for having invented teeth and steaks and for having created dentists, and St. Apollonia, please may their tribe increase."



# Research Projects and Support

Over the past decade additional emphasis has been directed toward increasing the research efforts of both the basic science and clinical departments. The impetus has been provided in part by the availability of research funds from a variety of sources: governmental, industrial and philanthropic. The total sum received by the Dental School *via* contracts, grants-in-aid and others exceed \$388,890 annually. The support is derived as follows:

|   |            |
|---|------------|
| 1. General research grants .....                | \$ 33,574. |
| 2. Research grants .....                        | 189,592.   |
| 3. Training grants .....                        | 146,162.   |
| 4. Cancer grants .....                          | 5,000.     |
| 5. Industrial and<br>philanthropic grants ..... | 14,570.    |

The research projects which are being conducted in the various departments are:

## *Department of Anatomy*

History of the Department of Anatomy in the University of Maryland School of Dentistry

Studies on the Effect of Vascular Compression in Pallida Thalami, Ammon's Horns and Cerebellum

Brain Injuries

Aneurysms

Regeneration in the Sea Lamprey, *Petromyzon marinus*

Cytokinesis in the Sea Lamprey Embryo

Comparative Embryological Development of Five Species of Lampreys Resident in the Upper Great Lakes  
Experimental Hybridization among Five Species of Lampreys Resident in the Great Lakes

Effects of Diurnal Fluctuation of Temperature on the Development of the Sea Lamprey, *Petromyzon marinus*  
Toxicity of Salicylanilides to Developmental Stages of the Sea Lamprey  
Chromosome Composition of the Sea Lamprey, *P. marinus*

The Effect of Several RNA—and DNA—Inhibitors on Regenerating Tissues in the Sea Lamprey

Influence of pH on the Toxicity of Salicylanilides to Developmental Stages of the Sea Lamprey

Programming Human Gross Anatomy *via* Video Tape

Effects of Tetracyclines on Various Life History and Developmental Stages of the Laboratory Mouse

## *Department of Biochemistry*

The Structural Integrity of Ribosomal RNA

Alkamine Esters and Ethers

Sources of Predental Students as Measured by Rank on Entering and in Dental School

## *Department of Community Dentistry*

The Dentist in Literature

Civil War Dentistry

Dental Truants (Non-Professional Accomplishments of Dentists)

Folklore of Dentistry

## *Department of Diagnosis and Radiology*

Average Exposure Dose of Clinic Population to X-Radiation

Determination of Anatomical Landmarks of the Skull on Panorex Film

Incidence of Anterior Median Palatal Cysts in the Clinic Population



*Department of Histology*

Carbohydrate Metabolism of *Streptococcus salivarius*. IV. Polysaccharide Synthesis Plaque Formation on Extracted Teeth

An Electron Microscopic Study of the Oxytalan Fiber

Cytochemical Investigations of Accessory Boring Organ in Certain Gastropods

Dentinogenesis in Man and Anthro-  
poidea

Electron Microscopic Evaluation of Restoration Adaptability

Characteristics of Prepared Cavity as Determined by Optical and Electron Microscopy, Part II. Variations in Toilet Procedures

Characteristics of Prepared Cavity as Determined by Optical and Electron Microscopy, Part III. Instrumentation at Variable Speeds

Secondary Dentinogenesis

Studies in Biological Oxidation in Developing *Ascaris* Eggs

Effectiveness of Vacuum Infiltration Method of Dental Pulp Fixation

The Mechanism of Action of Parathyroid Extract in Rat Kidney Mitochondria *In Vitro*

*Department of Microbiology*

The Biochemical Activity of *Pseudomonas aeruginosa*

The Cultivation and Enumeration of Anaerobic Microorganisms in the Gingival Crevice

Production of Antibiotics by *Mycorrhizal fungi*

The Cultivation of *Trichomonas tenax*

A Study of the Transference of Potentially Pathogenic *Staphylococcus aureus* from a Carrier Student-Dentist to His Patient

Isolation and Transfer of Pathogenic Micrococci

The Effect of Antistaphylococcal Antibiotics on Coagulase-Positive Organisms Isolated from the Nares of Dental Students

Transmission of Pathogenic Micrococci

Isolation of Antifungal Antibiotics from *Cenococcum graniforme*

The Biochemical Characteristics of *Pseudomonas aeruginosa* Strains Isolated Primarily from Human Sources

Nutritional Requirements of the Oral Protozoan *Trichomonas tenax*

A Comparison of the *In Vitro* Activities of Antistaphylococcal Antibiotics and Phage-Typability of the Coagulase-Positive Staphylococci Isolated from Student-Dentists.

*Department of Oral Medicine*

The Efficacy of a Single Seal Technique During Clinical Endodontic Treatment

Ectopic Osteogenesis on the Canine Mandible

Osteogenesis on the Canine Mandible Evaluation of Indices for Assessing Periodontal Disease

Clinical Evaluation of Orahesive Bandage

Clinical Evaluation of Processed Bovine Bone for Surgical Use

Oral Tissue Reactions to Methyl-2-Cyanoacrylate

*Department of Oral Surgery*

Educational Research in Programmed Teaching using Teaching Machine and Weekly Examinations using IBM Card System and Computers

*Department of Operative Dentistry*

A Comprehensive Study of Elastomeric Impression Materials



Measurement of Forces at the Interface Between a Restorative Material and the Cavity Walls

*Department of Orthodontics*

The Effect of Childhood Habits and Facial Development and Dental Occlusion

*Department of Pathology*

The Effect of Tetracyclines on the Teeth of Children

Experiments in Calcinosis and Calciphylaxis

The Structure of the Attachment of Calculus to Enamel

The Structures of the Midline of the Embryonal Palate and Their Relationship to the Pathogenesis of Naso-Palatine Cysts

The Accuracy of Diagnosis Using Biopsy and Exfoliative Cytology

*Department of Pedodontics*

A Revaluation of the Children's Hospital Dental Program for the Handicapped: Three Years Later

The Use of the Panorex as a Diagnostic Aid in the Treatment of the Handicapped

*Department of Pharmacology*

The Convulsive Properties of Analid Compounds

Convulsive Properties of Local Anesthetic Solution on Rats

Dimethyl Sulfoxide as a Vehicle for Topical Anesthetic Preparations

The Effects of Hypotensive Drugs on the Toxicity of Local Anesthetic Preparations

A New Local Anesthetic Drug—Aminospirane

*Department of Physiology*

Determination of Mucolytic Activity of Dithiothreitol on Salivary and Gastric Mucin

Membrane Transport in the Hamster Cheek Pouch Under Conditions of Various Electrolyte Environments

Electrical Potentials in the Normal and Carcinogen-Treated Hamster Cheek Pouch

Quantitative Relation of Major Mandible EMG to Mandibular Positions

Neurohumoral Mechanism of the Peripheral Vasodilator Response in the Dental Pulp

Effect of Thermal Stimuli on Dental Pulp Pressure

Effect of Sex Hormones on Carcinogenesis in the Hamster Cheek Pouch

Effect of Chronic Cerebral Stimulation on the Circulatory Dynamics in Dogs

A Study of the Process of Relaxation in Skeletal Muscle

*Department of Removable Prosthodontics*

Response of Deformed Tissue to Conditioning and New Dentures

## Gaver Memorial Lectureship

On March 25, 1966, the University Board of Regents accepted a gift of \$2,250 from the National Alumni Association of the Dental School, to establish an annual lecture to be known as the *Grayson W. Gaver Memorial*.

This gift will be added to the endowment fund of the University, and its annual income will be used to support a lecture in the field of Prosthodontics. This annual event will serve to memorialize the man who gave many years of dedicated service to the Dental School as Professor and Head of the Department of Removable Prosthodontics, Grayson W. Gaver.



## A Better and More Useful Museum of the Baltimore College of Dental Surgery

AN ORGANIZATIONAL MEETING OF THE FRIENDS OF THE MUSEUM OF THE BALTIMORE COLLEGE OF DENTAL SURGERY WILL BE HELD DURING JUNE WEEK, 1966 ON THURSDAY AFTERNOON, JUNE 2nd AT 1:30 IN ROOMS 202 A AND B OF THE BALTIMORE UNION. ALL INTERESTED PERSONS ARE INVITED TO ATTEND AND BECOME CHARTER MEMBERS.

In the course of human events there is a time and a place for everything. The time is now and the place is here, in Maryland, to rally effective assistance for one of dentistry's finest potential links with its past, and its future, the Museum of the Baltimore College of Dental Surgery. Inadequately housed and sorely neglected in this, the 126th year since the founding of the world's first dental college, a considerable and significant collection of *memorabilia* and armamentaria of the only important health discipline of American origin stands at the crossroads: to be continued as is for the occasional visitor or to be strengthened and made useful by instituting a program of adequate financial support, maintenance, care and accretion.

In May 1965, recognizing the Museum's plight, Dr. Elmer F. Corey of Baltimore addressed a letter to a hundred alumni of the Baltimore College of Dental Surgery, Dental School, University of Maryland, apprising them of the status of the Museum and invoking their interest. Forty-seven responded affirmatively, and as a consequence a committee was formed to organize and plan a course of action. The members of the committee, in addition to Dr. Corey, included:

LLOYD E. CHURCH, Bethesda  
PAUL A. DEEMS, Baltimore  
GARDNER P. H. FOLEY, Dental School  
ERNEST H. HINRICH, JR., Ruxton  
H. BERTON McCAULEY, Baltimore



WILBUR O. RAMSEY, Dental School  
EDWARD D. STONE, JR., Baltimore  
JOHN J. SALLEY, Dean  
J. BEN ROBINSON, Dean Emeritus  
MYRON S. AISENBERG, Dean Emeritus

During the ensuing summer the Committee met on three occasions. The outcome was a decision to establish the "Friends of the Museum of the Baltimore College of Dental Surgery, Dental School, University of Maryland." Membership in this group would be opened to anyone with serious interest in the story of dentistry, the first dental school, dental education, organization, literature or practice. As an association, it would conduct meetings featuring presentations, papers, and exhibits of dental historical interest. With the sanction and cooperation of the Dental School, it would aid in the maintenance and growth of the Museum and its utilization as an educational facility by acquiring and applying needed funds, seeking new additions, and establishing a mechanism for the collection of funds, instruments and equipment, books, documents, records, and objects of dental art and science related to the past and present of the profession and the school. An Advisory Committee including the Dean and Deans Emeriti of the Dental School would provide guidance and direction to the formation of policy and program.

Financial support for the activities of the organization would, it is hoped, come from membership dues and monies designated for the purpose from funds of the University of Maryland, its faculty, its alumni, organized dentistry, official agencies of government, and other historically oriented or interested persons and groups.

An opportunity is in the offing to receive recognition as a charter member in a distinguished company of men with an uncommonly noble purpose. To share the honor of initiating a new era in the development of the profession's most noteworthy historical collection and to further in this way a favorable public image of dentistry and dental education, particularly in Maryland, will cost the dentist who appreciates his profession only \$25, for which he may expect a handsome certificate of charter membership and one year of active participation in good standing of the affairs of the organization, after which his dues will be \$10 a year unless he is willing to pay \$100 for life membership. Contributing memberships at \$5 annually will also be available.

The Organization Committee enumerated previously, acting under a temporary chairman, plans to conduct a meeting during the 1966 June Week activities of the Alumni Association of the Baltimore College of Dental Surgery, Dental School, University of Maryland, in Baltimore. Persons wishing to affiliate with the new group are invited to attend and become charter members by paying the appropriate dues as decided by majority vote of those present. It is planned also that the first officers of the organization will be chosen at this meeting.

—H. BERTON MCCAULEY, D.D.S.



## Tribute To Dr. Conrad L. Inman, Sr.

Woodholme Country Club  
Baltimore, Maryland  
Saturday, February 5, 1966

Mr. Chairman, ladies and gentlemen of Alpha Omega and honored guests:

Today we are living in a wonderful age of scientific attainment. Great advances in mathematics are enabling us to explore outer space and to land on far-away planets, while the knowledge of nuclear fission is aiding us in medicine as well as in war. But, in my opinion, our greatest advance is in the field of ecumenical existence, man living in peace and understanding of others of divergent religious beliefs.

The man we are honoring tonight, Dr. Connie Inman, is a man who has been living and practicing ecumenical existence for the past 50 years that I have known him.

Although he is a Protestant in faith he is one who counts among his intimate friends men of the Catholic and Jewish faiths alike. You have just heard from Dr. Myron Aisenberg of their intimate friendship through the years, and I know of his closeness to Dr. Harry Seldin, and to our late beloved frater Morris Cramer as well as my own personal warm friendship through the past 50 years, and daily we see him coming to work in his car with Dr. Danny Shehan and of his friendship with many Catholics in this city. When it comes to living in close harmony with his fellowman, Connie Inman stands ten feet tall in stature. We read in the Bible that "Man is created in the image of God" and that we must, therefore, respect each man's individuality and person; we read the injunction in the good book, "Love thy neighbor." All these ancient Judaic teachings we hear falling from the lips of ministers, but only as lip service. Connie Inman doesn't preach it, he lives it day after day.

I want to compliment the officers of the Alpha Omega Fraternity and the committee which brought this event to fruition for recognizing these qualities of Judaeo-Christian living in Connie Inman and in honoring him tonight by granting him an honorary membership in our fraternity. While this invitation is long overdue it is nevertheless well merited and I will here paraphrase a line from the Book of Esther, *and thus it shall be done unto the man whom the Alpha Omega delighteth to honor.*

As Connie goes through the years being respected and beloved by his fellows in this community he also must derive a great deal of pleasure and satisfaction



from having in his office associated with him a son who follows so closely in his footsteps; a son who is proficient in his professional attainments and is also of the same good disposition which makes "Buddy" Inman so much like his father and so much respected and beloved by all those who work with him and whom he daily befriends.

In conclusion, I'm sure I voice the hopes and prayers of all his friends assembled here tonight when we wish Connie Inman many more happy, healthy years in the enjoyment of his family circle and of his many friendships.

DR. M. K. BAKLOR





## Dental Students' Conference on Research

On February 17-19, 1966, The Second Annual Dental Students' Conference on Research was held at the International Inn in Washington, D. C. The conference was sponsored by the American Dental Association, Council on Dental Research and supported jointly by participating dental schools and the Professional Relations Division of Procter and Gamble Company. Students from fifty-two dental schools in the United States, Canada and Puerto Rico were in attendance. The purpose of the session was to familiarize the prospective researchers with the rapidly expanding field of dental research. To accomplish this, an ambitious program which included lectures by prominent dental researchers and educators was organized. Tours were also conducted.

On tour at the National Bureau of Standards, it was learned that the research in progress is both practical and basic. The latter deals principally with tooth crystal structure and growth as well as thermodynamics and surface transport. The Bureau's practical research is concerned with the development of dental materials and the formulation of their standards of quality.

At the National Institute of Dental Research the students were informed of the kinds of research being executed intra- as well as extramurally. In its coordinating and supportive capacity, the Institute reserves four-fifths of its total working funds for the extramural programs which include research and a variety of developmental awards. The National Institute of Dental Research is

currently sponsoring 450 different projects being conducted at 150 institutions including the 50 dental schools. It further supports 100 trainees and approximately 90 fellows.

The lecture series closed with a presentation on "Dental Research and Academic Dentistry" by Dr. John J. Salley. Dr. Salley discussed the many opportunities available to students interested in a career in academic dentistry. He pointed out that the vast expansion of dental schools in the past decade has placed dental researchers and educators at a premium. In the United States, for example, over 150 vacancies exist on dental faculties.

Dr. Salley emphasized the need to utilize all the resources of the University in the solution of health problems. This, he maintains, requires better interdepartmental and interdisciplinary communication within the University. It is dependent, moreover, upon a *de facto* coordinated and integrated educational format in all health science areas. Dr. Salley commented that dental education must strive to match its technical superiority with excellence in biological orientation. This excellence in biological orientation can be more rapidly achieved by simultaneously increasing the qualitative and quantitative aspects of dental research as well as dental curriculum reforms. Only by doing this, he contends, can dentistry best serve the public.

PATRICK LOONEY  
*Student Representative  
to the Conference*



## Collegia Dentica Squibb

The inauguration of a long-range plan to create a collection of original oil paintings of the dental colleges of America was held Tuesday, November 23 with the unveiling and presentation of the painting of the Baltimore College of Dental Surgery, Dental School, University of Maryland, to Dean John J. Salley. The project is known as "Collegia Dentica Squibb". It will continue until representative paintings of all 46 dental schools have been completed.

The painting shows the Dental School building and is the work of Stuart Grayson Garrett, noted artist and member of the faculty of the art department of the City College of New York. His works have been exhibited in the National Academy of Design, the American Water Color Society, the Smithsonian Institution and Musée de la Marine, Paris. Dean Salley felt that this particular view captures the structural individuality of the school and will be lastingly remembered by every graduate.

The presentation was made at a luncheon held at the Lord Baltimore Hotel in Baltimore. Invited were many citizens of prominence in education, government and medicine, including: Richard W. Case, Louis L. Kaplan, Thomas B. Symons, William C. Walsh, and Charles P. McCormick, members of the University of Maryland Board of Regents; Dr. Albin O. Kuhn, executive vice president of the University; Theodore R. McKeldin, Mayor of Baltimore City; Louis L. Goldstein, State Comptroller of Maryland; and George S. Squibb, vice president for public and legal affairs.

Mr. Squibb, in making the presentation to Dean Salley, noted that the College was celebrating its 125th anniversary and said, "Squibb is proud to make this lasting contribution to dentistry by honoring the Baltimore College of Dental Surgery. It is especially fitting that the world's first dental school be selected as the first subject of this enduring program."



**Presentation of Oil Painting by George Squibb (right) to Dean Salley (left). Mayor McKeldin (center) observes ceremony.**



## Faculty Activities at a Glance

That the academic stature of the dental school continues to grow and flourish is evidenced by the increased depth of the various departments and the established authoritative competence of their constituents. The latter is attested to by the active contributions of the faculty.

Dr. Irving Abramson, Associate Professor of Oral Medicine, who this year has been elected President of the Alumni Association of the Dental School and who has been appointed Fellow, the American Association of Endodontists as well as attaining the status of Diplomate of the American Board of Endodontists presented a clinic at the District of Columbia Dental Society Meeting and three papers, "The Clinician Looks at the Pathology of the Pulp and Periapical Tissue", "The Endodontically-Periodontally Involved Teeth" and "Apical Curettage and Root Resection".

Dr. Charles C. Barr, Associate Professor of Oral Medicine and Coordinator of Clinical Sciences, in addition to participating in the Regional Workshop of Dental Examiners and Educators, presented a clinic on "Periodontal Significance of Proper Interdental Contours" as well as four papers: "Osteogenic Activity in Acute Vitamin C Deficiency", "Preventive Dental Care", "Oral Healing in Ascorbic Acid Deficiency" and "Wound Healing".

Dr. Sue-ning C. Barry, Assistant Professor of Histology and Embryology, presented papers before the 43rd General Meeting of the International Association for Dental Research in Canada and the Lynchos Society of Longwood College of Virginia. The papers dealt with various aspects of carbohydrate metabolism of *Streptococcus salivarius*.

Dr. Joseph P. Cappuccio, Associate Professor of Oral Surgery, has been accorded many honors during the past year among which may be listed his appointment as Deputy Regent for the Maryland Section of the International College of Dentists and Secretary of the Alumnae Association. He has presented numerous papers to various civic and professional groups on topics such as "Dysfunctions of the Temporomandibular Joint", "Differential Diagnosis of Facial Pain", "The Role of the Dentist in the Health of the Community", "Office Anesthesia" and "Medicare-Elder care".

Dr. William K. Collett, Assistant Professor of Oral Diagnosis and Radiology, was awarded a Doctorate of Science in Radiation Biology from the University of Pittsburgh. In addition to presenting two postgraduate courses in "Dental Radiology", Dr. Collett read papers before various scientific and professional groups on "Effects on Odontogenesis Following X-Radiation of the Oral or Thyroid-Parathyroid area of the Albino Rat", "Oral Roentgenology", "Radiographic Diagnosis of Lesions of Maxilla and Mandible" and "Long-cone Parallelism and Panorex Radiography".

Dr. Edward C. Dobbs, Professor of Pharmacology, who was appointed a member of the Nutritional Advisory Committee of the American National Red Cross, presented a paper on "Convulsiveness of Local Anesthetics" before the International Association for Dental Research in Toronto, Canada and a paper on "Pharmacodynamics of Local Anesthetic Drugs" at a Research Institute in Rensselaer as well as moderating a symposium on drugs.



Dr. Frank A. Dolle, Assistant Professor of Pharmacology, has been appointed Abstracter for Oral Research Abstracts and Associate for the Journal of Oral Therapeutics and Pharmacology.

Dr. Brice M. Dorsey, Professor of Oral Surgery, participated in the Regional Workshop on Principles of Undergraduate Training and Education, and presented a paper on "Oral Tumors."

Professor Gardner P. H. Foley was elected Assistant Editor as well as a member of the Board of Editors for the Journal of Dental Education.

Dr. Lawrence F. Halpert, Assistant Professor of Oral Medicine, presented a clinic on "Occlusal Adjustment by Selective Grinding" and five papers on "Occlusion and Periodontics", "Treatment Planning", "T. M. J. Dysfunction Syndrome", "Surgical Periodontics" and "Occlusal Adjustment".

Dr. Daniel Jacobs, Clinical Associate in the Department of Oral Medicine, presented three papers and a projected clinic on "Periodontics, Endodontics, or What?", "Significance of Condensing Osteitis", "Clinical Significance of Condylar Osteitis" and "Endodontics".

Dr. Frank C. Jerbi, Associate Professor of Removable Prosthodontics, has presented ten papers on selective topics such as, "Removable Prosthodontics", "Removable Partial Denture Clasps and Their Application", "Immediate Complete Dentures", "Mouth Preparation for Removable Partial Dentures", "The Concept of Guiding Planes in Removable Partial Denture Construction", "Removable Partial Denture Design", "Considerations for the Periodontium in Removable Partial Denture Construction" and "Esthetics in Denture Construction".

Dr. George Krywolap, Assistant Professor of Microbiology, presented two papers on "Production in Nature of

Antibiotics by Mycorrhizal Fungus" and "Antibiotics and Their Use in the Control of Bacterial Infections".

Dr. Barry S. Lever, Assistant Professor of Oral Medicine, in addition to variously serving as discussant and panel moderator has presented a clinical demonstration and papers on "Occlusal Trauma", "Acute Necrotizing Ulcerative Gingivitis", "The Radiograph and Periodontal Disease" and "Curettage".

Dr. Allan C. Levey, Assistant Professor of Oral Surgery, presented a paper on "Hospital Dentistry" before the Gorgas Odontological Society in Baltimore.

Dr. Martin A. Levin, Assistant Professor of Oral Medicine, has presented four papers before various professional societies. The topics included "Oral Physiotherapy", "Occlusion and a Technique for the Adjustment of the Natural Dentition", "Oral Physiotherapy Instruction in the Office" and "When Should the General Practitioner Refer to a Periodontist?".

Dr. Martin Lunin, Professor of Pathology, who was appointed chairman of the Hatton Award Committee of the International Association for Dental Research, has presented six papers which included "The Pathology of the Periodontal Pocket", "Epithelial Rests and Cysts of the Gingiva", "Programmed Instruction in Dental Education", "Wound Healing" and "Exfoliative Cytology".

Dr. José E. Medina, Assistant Dean, in addition to participating in many workshops, directing and moderating numerous seminar-groups and other organized programs presented over 16 papers to various professional societies throughout the United States and Central America. Some of the topics include "Dental Education", "Effect of Storage on Mercaptan Rubber Impression",



"Amalgam Restorations", "Operative Dentistry", "Silicate Cements", "Silicate Restorations", "Conservative Operative Dentistry", "Mat Gold-Gold Foil Restorations", "Cohesive Golds", "Use of Gold in Restorative Dentistry" and "Dental Education in the State of Maryland". Dr. Medina presented a course in Operative Dentistry to the Department of Operative Dentistry of the University of San Carlos, Guatemala City, Guatemala, sponsored by the U. S. Department of State. During his visit, Dr. Medina was elected an honorary member of the Guatemala Dental Society. He has also been appointed to the Dental Teaching Facilities Construction Review Committee of the Division of Dental Health of the U. S. P. H. Service.

Dr. Martin H. Morris, Instructor in Biochemistry, was awarded a Doctorate in Philosophy by the Graduate School of the University of Maryland.

Dr. J. Philip Norris, Assistant Professor of Oral Medicine, who was appointed Fellow, the American Association of Endodontists, presented three papers. The topics included "Endodontics" and "Bleaching Methods".

Dr. Ernest B. Nuttall, Professor of Fixed Prosthodontics, participated in the Regional Workshop of Dental Examiners and Educators in Washington, D. C.

Dr. George W. Piavis, Professor of Anatomy, participated in the First Workshop in Developmental Immunology, sponsored by the National Institute of Child Health and Human Development. He also presented four papers: "Embryology of the Sea Lamprey", "The Effects of 6-Methyl-Mercaptopurine on the Development in Sea Lamprey, *Petromyzon marinus*, Embryos" and "Cytokinesis in the Sea Lamprey, *Petromyzon marinus*, Embryos".

Dr. David N. Plessett, Assistant Pro-

fessor of Oral Medicine, presented four papers before various dental groups. The topics included "Control of Mobility", "Periodontal Disease and Oral Hygiene", "Diagnosis, Prognosis and Treatment Planning" and "Periodontics".

Dr. Burton R. Pollack, Professor of Community Dentistry, presented a two-day course on "Hospital Dentistry with General Anesthesia: An Intensive Program to Meet the Dental Needs of the Handicapped and Patients with Massive Dental Defects".

Dr. Kyrle W. Preis, Professor of Orthodontics, lectured to some of the dental societies of Pennsylvania and Maryland on "Childhood Habits which Affect Facial Development and Dental Functions" and "Simple Orthodontic Appliances".

Dr. Charles T. Pridgeon, Professor of Oral Medicine, who was re-elected President of the Baltimore Society of Periodontology has moderated and participated in a continuing education course in Periodontics and has presented two papers: "A Re-evaluation of Etiological Factors in Periodontal Disease" and "Practical Periodontics".

Dr. Robert Probst, P.H.S. (N.I.D.R.) Trainee in the Department of Microbiology, presented a paper on "Oral Protozoa: Detection by Acridine Orange Fluorescence Microscopy" before the International Association for Dental Research in Toronto, Canada.

Dr. D. Vincent Provenza, Professor of Histology and Embryology, has jointly presented papers with Dr. Ramesh C. Sardana, Research Associate and Marija Duda, P.H.S. (N.I.D.R.) Trainee, dealing with "Optical and Ultrastructural Characteristics of Prepared Tooth Surfaces" and "Elastic Fibers of the Soft Palate". Drs. Provenza and Sardana also participated in N.I.D.R. sponsored



Workshops on the "Dental Pulp Organ" and "Adhesive Restorative Dental Materials".

Dr. Wilbur O. Ramsey, Professor of Removable Prosthodontics, with Drs. J. C. Morris and S. D. Soman, assistant professors, presented a postgraduate course in "Complete Denture Impressions".

Dr. Norton M. Ross, Associate Professor of Pharmacology, who was elected to the Society of Sigma Xi and President of the Maryland Section of the American Academy of Dental Medicine, presented a paper on "A Preliminary Clinical Evaluation of Phenethicillin". He also participated in a symposium on drugs.

Dean John J. Salley has not only participated in numerous workshops and institutes, represented the A.D.A., A.A.D.S. before the Senate Committee on H.E.W. appropriations, and served as a member of Visiting Project Site Teams, but he also presented over a score of papers dealing with such diverse topics as "The New Dental Building", "Smoking and Oral Cancer", "Forensic Dentistry", "Challenges in Dentistry", "Electric Potentials in Hamster Cheek Pouch During Early Carcinogenesis", "Dental Identification in Aircraft Disasters", "Developing a Program in Preventive Dentistry and Community Dentistry", "Systemic Disease and the Oral Cavity", "Dentistry and the Educated Man", "Disaster Preparedness", "Oral Cancer Research" and "Dental Research and Academic Dentistry".

Dr. Joseph H. Seipp, Jr., Instructor in Histology and Embryology, presented a paper, "Dentistry as a Career" before the Mendel Club of Loyola College.

Dr. Donald E. Shay, Professor of Microbiology, presented a paper on "A Study of the Transference of Potentially Pathogenic *Staphylococcus aureus* from a

Carrier-Student-Dentist to His Patients" before the International Association for Dental Research meeting in Canada. In Costa Rica, Dr. Shay presented papers on "The Teaching of Microbiology to Dental Students" and "The Transfer of *Staphylococcus aureus* from Dentist to Patient".

Dr. Frank J. Sinnreich, Associate Professor of Anatomy, participated in a course, "Fundamentals of Statistical Analysis", presented by the Department of Preventive Medicine.

Dr. Rodger F. Sisca, Instructor in Operative Dentistry, presented a paper, "Tooth Morphology and Tooth Development" before the Predental Club of the University of Maryland.

Mr. Willard N. Smith, P.H.S. (N.I.D. R.) Trainee in the Department of Histology and Embryology presented two papers, "Coccidiosis in Sheep in Southeast United States" and "Effects of Inhibitors on Oxygen Uptake and Terminal Respiration in *Ascaris* Egg Homogenates" at the U. S. Animal Disease Laboratory and American Society of Parasitologists Conferences respectively.

Mrs. Leah Staling and Dr. Jerome D. Buxbaum, Instructor in—and Assistant Professor of Physiology, respectively, presented a paper, "Quantitative Relation of EMG to Mandibular Position", before the International Association for Dental Research meeting in Toronto.

Mr. Claude P. Taylor, Director of Visual Education, presented a "Career Opportunities" exposition for the Maryland Health Centers Council.

Dr. Edmond G. Vanden Bosche, Associate Professor of Operative Dentistry, was appointed head of his department. Our congratulations and best wishes for his continued success.

Dr. Jackie G. Weatherred, Assistant Professor of Physiology, who was award-



ed a Doctorate in Philosophy by the University of Texas, presented a paper on the "Effect of Thermal Stimuli on Pulp Chamber Pressure" and with Mrs. Gretchen H. Bean, Instructor in Physiology, a paper, "Electrical Potentials of Normal and Carcinogen-Treated Hamster Pouches". These presentations were made at the General Meeting of the International Association for Dental Research in Toronto, Canada. Dr. Weatherred was the recipient of the Regent's Excellence in Teaching Award.

Dr. John I. White, Professor of Physiology, presented a paper with Mr. John E. Bonas, Research Associate in Physiology, on "Calcium Binding by the Sarcoplasmic Reticulum".

Dr. Riley S. Williamson, Professor of Restorative Dentistry, has participated in numerous workshops and conferences during the past year. The many lectures and papers delivered covered such topics as "Dentist - Laboratory Relations", "Fixed Restorations", "Semi-Rigid and

Rigid Impression Materials", "The Challenge of General Practice", "When is Splinting of Teeth Indicated?", "Implementation of the Treatment Plan" and "Management of the Patient's Problems". Dr. Williamson has been appointed Consultant, Restorative Dentistry, Veterans Administration Hospital, Baltimore.

Dr. Robert M. Zupnik, Clinical Associate in Oral Medicine, in addition to participating in a "Periodontics" continuing education course, has presented several lectures on "Gingivectomy Technique and Its Limitations" and "Diagnosis and Treatment of the Marginal Periodontal Lesion".

Dr. George A. Zurkow, Clinical Associate in Oral Medicine, who attained the status of Diplomate, American Board of Endodontists, has presented a training course on "Endodontia" and several papers entitled "What's New in Endodontics" and "Drugs of Choice".

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#### DR. KRESHOVER

Appointed Director of N.I.D.R.

The appointment of Dr. Seymour J. Kreshover as Director of the National Institute of Dental Research was announced March 7, 1966 by Dr. William H. Stewart, Surgeon General of the Public Health Service. In this position, Dr. Kreshover will carry the rank of Assistant Surgeon General. Dr. Kreshover succeeds Dr. Francis A. Arnold, Jr., who has been named the Service's Chief Dental Officer.

"Dr. Kreshover brings to this position a unique combination of capabilities in dentistry, medicine, and general science," Dr. Stewart said. "As associate director in charge of research for the Dental Institute for the past nine years, he has contributed greatly to a broader biological orientation of the dental sciences.





This expansion of research perimeters has proved fruitful in achieving a better understanding of the oral disorders, leading to their more effective control and eventual prevention."

Dr. Kreshover received his commission in the Public Health Service in 1956. For the previous seven years he had been associated with the Medical College of Virginia as Professor of Oral Pathology and Diagnosis, Director of Dental Research, and Director of Graduate and Postgraduate Studies. Earlier he had successively held the posts of Assistant in Oral Surgery at the Yale University School of Medicine. Chief of the Periodontia Clinic at the Roosevelt Hospital in New York, and Teaching Fellow in Histo-anatomy at New York University, following which he briefly engaged in private dental practice.

A native of New York, Dr. Kreshover received the D.D.S. degree from the University of Pennsylvania School of Dentistry in 1938, the Ph.D. degree in clinical medicine and pathology from Yale University in 1942, and the M.D. degree from New York University School of Medicine in 1949.

In 1961 the University of Buffalo bestowed on him the honorary degree of Doctor of Science. Among his other honors, Dr. Kreshover was awarded the Meritorious Service Medal of the Public Health Service for his outstanding leadership in research, his marked dedication to public service, and his valuable contributions to dental research and dental education and the communication of research findings.

Dr. Kreshover is Secretary of the Section on Dentistry, American Association for the Advancement of Science; Chairman, Commission on Dental Research, Federation Dentaire Internationale; and past President of the Interna-

tional Association for Dental Research.

In addition to holding membership in several medical and dental associations, he is a Diplomate of the American Board of Oral Medicine, a member of the Committee on Dentistry and a former member of the Committee on Pathology, National Research Council. He is also a Consultant to the American Dental Association's Council on Dental Research. He has served on several Public Health Service councils and committees.

He has authored or co-authored over 40 publications.

#### DR. DIEFENBACH

Dr. Viron L. Diefenbach, deputy chief of the Division of Dental Health, U. S. Public Health Service, has been named



assistant surgeon general and chief of the Division.

Dr. Diefenbach, a career officer in the Public Health Service for 17 years, has



been deputy chief of the Dental Division since 1962. In that capacity, he has had responsibility for broad programs in dental education, dental economics and prepayment plans, epidemiology, fluoridation, and oral cancer detection. The Dental Division, a component of the Public Health Service's community health activity, supports oral health programs in every State of the Union.

In announcing the appointment, Dr. Stewart said, "Dr. Diefenbach's knowledge and stewardship of the programs of the Division over the past four years will provide unique stimulus for future rapid progress toward the goal of better oral health for all our citizens."

A graduate of the Baltimore College of Dental Surgery, University of Maryland, Dr. Diefenbach was the recipient of the University's Gold Medal for Scholarship and received his dental degree *magna cum laude*. He also holds the degree of Master of Public Health from the University of Pittsburgh and has been awarded fellowships in the American Public Health Association, the American Association for the Advancement of Science and the American College of Dentists. He is a Diplomat of

the American Board of Dental Public Health.

Since 1949, Dr. Diefenbach's entire professional career has been devoted to service in dental public health. He completed a dental internship in the Public Health Service Hospital in Norfolk, Virginia, and served in PHS hospitals and regional offices in Los Angeles, Cleveland, Kansas City, Chicago, and Denver.

Dr. Diefenbach is a member of the American Dental Association, the American Public Health Association, the American Association of Public Health Dentists, and the American College of Dentists.

The author of numerous publications in the field of dental public health, Dr. Diefenbach has spoken and written extensively on the effectiveness of water fluoridation in the prevention of dental decay and has stressed the benefits which American communities have derived from this public health measure. With his guidance, the Division of Dental Health has moved steadily to expand the use of community water fluoridation and this method of decay prevention is now in use by about a third of the American population.



# Faculty Appointments

Dean John J. Salley announces the appointments of Paul D. Bingham, D.D.S., (U. of Md.) to the Department of Oral Diagnosis and Radiology; Buckner S. Burch, B.S., D.D.S., (U. of Southern Calif., St. Louis U.) to the Department of Pathology; Everard F. Cox, B.S., M.D., (U. of Utah, U. of Md.) to the Department of Oral Surgery; Benjamin S. Crosby, D.D.S., (U. of Md.) to the Department of Pedodontics; R. Neal Edwards, D.D.S., (U. of Kansas City) to the Departments of Oral Diagnosis and Radiology; Werner Fischlschweiger, Ph.D., (U. of Graz, Austria) to the Department of Histology; Francis A. Formica, D.D.S., (W. Va. U.) to the Department of Operative Dentistry; Murray G. Greenberg, B.S., D.D.S., (U. of Md.) to the Department of Pedodontics; Frank C. Jerbi, D.D.S., (Loyola of Chicago) to the Department of Removable Prosthodontics; Allan C. Levey, D.D.S., M.S., (U. of Mich., Georgetown U.) to the Department of Oral Surgery; Elka S. Levin, B.S., D.D.S., (Nat. College J. F. Alcorta, U. of Buenos Aires) to the Department of Pathology; Martin A. Levin, B.S., D.D.S., (U. of Md.) to the Department of Oral Medicine; Charles E. Loveman, A.B., D.D.S., (The Johns Hopkins U., Columbia U.) to the De-

partment of Anatomy; Edwin L. Maxwell, D.D.S., (U. of Md.) to the Department of Operative Dentistry; Joseph E. Mettler, D.M.D., (U. of Louisville) to the Department of Pedodontics; Bradley L. Nelson, B.S., D.D.S., (U. of Md., Marquette U.) to the Department of Pedodontics; George Orlove, A.B., D.D.S., (George Wash. U., Med. Col. of Va.) to the Department of Operative Dentistry; Harold A. Pevey, D.D.S., (Georgetown U.) to the Department of Pedodontics; Kenneth R. Rankin, D.D.S., (U. of Md.) to the Department of Operative Dentistry; Morris Roseman, B.S., M.A., Ph.D., (U. of Md., Duke U.) to the Department of Community Dentistry; Rosalynde K. Soble, B.A., M.S.W., (U. of Md.) to the Department of Community Dentistry; Thaddeus Weglarski, D. D.S., (U. of Penna.) to the Department of Oral Surgery; Jerome J. Weinstein, B.S., D.D.S., (U. of Md.) to the Department of Pedodontics; Esther Wollin, B.A., M.P.H., (Rutgers U., U. of Mich.) to the Department of Community Dentistry; Albert W. Zanner, B.S., D.D.S., (American U., U. of Md.) to the Department of Pedodontics.

Your administration and colleagues welcome and wish for you many enjoyable and fruitful years in our educational community.



## Publications by Faculty

The scholarly contributions by the Dental School faculty to the literature from March of 1965 through February of 1966 include:

- BARR, C. E.: Oral healing in ascorbic acid deficiency, *Periodontics*, **3** (6): 286, 1965.
- COLLET, W. K.: Dental students' attitudes towards integration of basic sciences and clinical practice, *J. Dent. Educ.* **29**: 190, 1965.
- DOBBS, E.: Chrononlogical history of local anesthesia in dentistry, *J. Oral Therap.* **1** (5): 546, 1965.
- FOLEY, G. P. H.: The Quarterly Post, *J. Dent. Educ.* **29**: 11, 1965.
- .....: The Quarterly Post, *J. Dent. Educ.* **29**: 129, 1965.
- .....: The Quarterly Post, *J. Dent. Educ.* **29**: 227, 1965.
- .....: The Quarterly Post, *J. Dent. Educ.* **29**: 325, 1965.
- .....: Writing courses in the dental curricula, *J. Dent. Educ.* **29**: 128, 1965.
- KAPUR, K., SOMAN, S., and STONE, K.: The effect of denture factors on masticatory performance. Part I. Influence of denture base extension, *J. Prosth. Dent.* **15**: 54, 1965.
- KLINE, A., BLATTNER, R., and LUNIN, M.: Transplacental effect of tetracyclines on teeth, *J. Oral Therap.* **2**: 216, 1965.
- MATT, M. STOUT, F., and SWANCAR, J.: A method of measuring *in vitro* plaque, *J. Dent. Res.* **4** (2): 453, 1965.
- MINKER, J.: Simplified full coverage preparation, *Dent. Clin. N. Amer.* July, 1965.
- RAY, J., J., and SHAY, D.: Agar-gel precipitin-inhibition techniques for C-reactive protein determinations. I. Preliminary evaluation of technique, *Appl. Microbiol.* **13** (5): 706, 1965.
- RICE, L., DOBBS, E., and GROGAN, C.: Spiranes. X Aminospirane, *J. Med. Chem.* **8**: 825, 1965.
- ROSS, N.: Phenethicillin in dental infections, *J. Dent. Med.* **20**: 85, 1965.
- SACKTOR, B., WORMSER-SHAVIT, E., and WHITE, J.: Diphosphopyridine nucleotide-linked cytoplasmic metabolites in rat leg muscle *in situ* during contraction and recovery, *J. Biol. Chem.* **240**: 2678, 1965.
- SMITH, R., and SHAY, D.: Steroid lyses of protoplasts and effects of stabilizers and steroid antagonists, *Appl. Microbiol.* **13** (5): 706, 1965.
- SOMAN, S., and KAPUR, K.: The effect of denture factors on masticatory performance. Part V. Food platform area and metal inserts, *J. Prosth. Dent.* **15**: 857, 1965.
- WILLHOIT, D., COLLETT, W. K., and WALD, N.: Neutron induced dental fragility, *Radiat. Res.* **25**: 115, 1965.

Dr. José E. Medina functioned as the reviewer for the Journal of the American College of Dentists. A personal evaluation of the Ingraham and Koser text, *An Atlas of Cast Gold Procedures* was published in Volume 36, 1965.



## In Memoriam



With the death of Dr. E. G. Vanden Bosche, Professor and Head of the Department of Biochemistry, on August 28, 1965, the students and faculty of the Dental School not only lost an academician but a friend.

Born in Belgium, Dr. Vanden Bosche and his parents immigrated to California, Pennsylvania where he spent his youth. Following his graduation from Lebanon Valley College in 1922, graduate studies were pursued at Columbia University and the University of Maryland. The culmination of his efforts was a Master of Science degree in 1924 and a Doctorate of Philosophy in 1927, both of which were awarded from the University of Maryland Graduate School. Dr. Vanden Bosche held a post-doctoral research position in Electrochemistry at U. S. Bureau of Standards and later joined briefly the faculty of the College of Arts and Science, University of Maryland, and in 1927 was appointed Assistant Professor in the School of Dentistry from 1927 to 1942. In 1942 he became an Associate Professor in the Department of Biochemistry, School of Dentistry, Professor in 1947 and later Professor and Head from 1956 until his death. His contributions to the field of science have been in the areas of electrode potentials, solubility of fused salts and electrodeposition. Dr. Vanden Bosche's professional activities included memberships in the American Chemical Society, Alpha Chi Sigma, Sigma Xi, Maryland Biological Society, of which he was a former President, and an abstracter of French literature for Chemical Abstracts for 32 years. In recent years, Dr. Vanden Bosche also served as Chairman of the Committee on Admissions at the Dental School.

Dr. Vanden Bosche is sadly missed yet fondly remembered by all of his colleagues as well as the many students with whom he came in contact. His death left a void in the hearts of those who knew and worked with him. We, the faculty, alumni, and student body of the Dental School, wish to express our abiding affection and respect for Dr. Vanden Bosche.

CHARLES B. LEONARD, JR.



# Tentative Commencement Program

## June Week 1966

### THURSDAY, May 26

- 4:00 p. m. Senior Announcements  
 5:00-  
 6:30 p. m. Stag Cocktail Party—Belvedere Hotel, Jubilee Room  
 In honor of Student Graduates

### WEDNESDAY, June 1

- 6:30 p. m. Rolling Road Golf Club  
 OMICRON KAPPA UPSILON (PHI CHAPTER)  
 Banquet and Convocation

### THURSDAY, June 2

Baltimore Union Building

- 9:00 a. m. Board of Trustees Meeting—Dental School  
 10:00 a. m. Annual Business Meeting of the Alumni Association  
 12:00 Noon Past President Brunch—(open to all in honor of Presidents)  
 1 - 4 p. m. Tour of School  
 Belvedere Hotel  
 4:30-  
 6:30 p. m. Cocktail Party—Charles Room  
 In honor of Student Graduates

### CLASS REUNIONS

|      |           |                        |      |           |                          |
|------|-----------|------------------------|------|-----------|--------------------------|
| 1916 | B.C.D.S.  |                        | 1936 | U. of Md. | Dr. William Kress        |
|      | U. of Md. | Dr. Albert Z. Aldridge |      |           | Dr. Elmer H. Hoffman     |
| 1921 | B.C.D.S.  |                        | 1941 | U. of Md. | Dr. Paul S. Dubansky     |
|      | U. of Md. | Paul Bingham           |      |           | Dr. Jerome S. Cullen     |
| 1926 | U. of Md. | Dr. Harry Levin        | 1946 | U. of Md. | Dr. Joseph P. Cappuccio  |
| 1931 | U. of Md. | Dr. Gordon Lewis       | 1951 | U. of Md. | Dr. Benj. S. Crosby, Jr. |
|      |           | Dr. E. B. Nuttall      | 1956 | U. of Md. | Dr. J. Philip Norris     |
|      |           |                        | 1961 | U. of Md. | Dr. James E. Palmer      |

### FRIDAY, June 3

- 9:30 a. m. Honors Convocation—Health Sciences Library Auditorium  
 Distinguished Alumnus to be honored  
 12:15 p. m. Buffet Luncheon—Baltimore Union Building  
 To honor Fifty Year Graduates (Class of 1916) and Graduates (Class of 1966)  
 Installation of new Officers to Alumni Association  
 2:30 p. m. Tee-off Time—(Club to be announced)

### SATURDAY, June 4

Commencement—College Park, Maryland







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# JOURNAL of the

**BALTIMORE COLLEGE OF DENTAL SURGERY**

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*Color photograph: Architect's rendering of the proposed  
University of Maryland School of Dentistry*

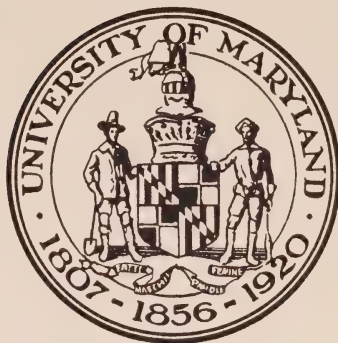


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***Published by the Faculty of the  
University of Maryland, School of Dentistry***

D. VINCENT PROVENZA, *Editor*

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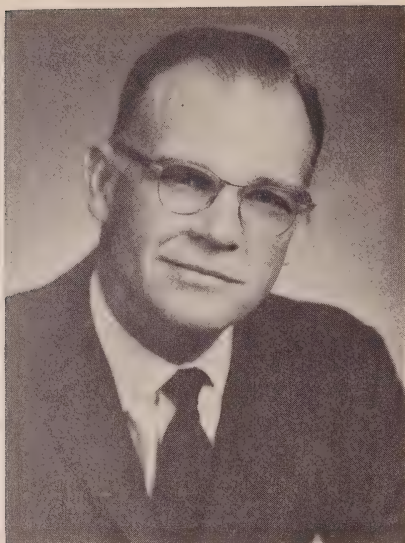
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Knowledge is accumulating rapidly and technology is developing apace. Change is the most striking characteristic of this revolutionary era. In the present setting, any program which fails to recognize the need to reevaluate and to revise will soon be inadequate to serve its purpose.

The modern university is under constant stress and strain. It must hold to lasting values, and it must seek ways for adjustment and improvement. While the university as a whole must be committed to progress, the change can take place only within specific disciplines.

During the past few years the School of Dentistry of the University of Maryland has been planning a new physical facility, and the faculty has been engaged in a thorough study of the total education program.

The goal is a complete Dental Health Center with a balance of teaching, research and service. The establishment of a Dental Center, emphasizing the preparation of the practitioner and including scholarly research and the training of auxiliary personnel, is the proper role of a dental school within a university. Teaching stagnates without research, the profession suffers from lack of new discoveries, and the dentist is handicapped without adequate supporting personnel.

The program and team are described in the following pages written by an enlightened dental educator. Dean Salley is providing strong and able leadership for Maryland's proud heritage in collegiate dentistry. He illuminates the present and the future in his "New Dimension in Dental Education."

WILSON H. ELKINS, *President*  
University of Maryland



# The Dental Health Center— A New Dimension in Dental Education at the University of Maryland

JOHN J. SALLEY, *Dean*

Universities produce doctors, lawyers, scholars, teachers, engineers, administrators, architects, ministers and other professionals in unending streams. They are also now constantly busy studying and seeking solutions for new or recurrent problems of individuals and societies. . . . But surely the most important accomplishments during an academic year at a university are increments in individual lives.

NATHAN M. PUSEY  
*President, Harvard University*

The statement of President Pusey reprinted above provides simple but eloquent guidelines to all segments of a university community. By its reinforcement of the uniqueness of the role of the university in today's society, it may be considered as a central theme for the pages that are to follow. Because dental education has achieved university status only relatively recently and because it is still in need of added refinements before attaining a complete scholarly position among its peers, it is entirely appropriate that dental school faculties subject themselves to careful self-scrutiny with respect to their past, their present and, especially, their future. At the start of the present decade, a variety of opportunities was offered to dental faculties and university administrators to work together toward creation of new dimensions for the education of dentists. While the primary responsibility for innovation and implementation in dental education rests with the universities, the dental profession, in general, must recognize a con-

tinuing obligation to provide its collective wisdom to its colleagues in the academic setting.

We are all aware that dentistry as a profession has been undergoing rapid changes during the past quarter of a century, both in its scientific knowledge and in its artistic principles. Recent discoveries and developments applicable to dental practice, however, are by no means the only factors affecting dentistry today. The ever increasing demands for more services to all segments of society, the impact of local, state and federal legislation and the rising educational and economic status inherent in a progressive civilization are but a few of the other factors affecting the practice of dentistry. All members of the dental community should be cognizant of these socio-economic trends and attempt, in one way or another, to fulfill what is expected of them as health professionals.

Dental practice today reflects little resemblance to its image of twenty years ago, nor can it be similar to



dental practice twenty years hence. Research activities have expanded to such a degree that it is difficult to predict what new scientific and technologic knowledge will be uncovered, discovered or developed in the next two decades. Fluoridation, a relatively unknown measure twenty years ago, has now been confirmed as an effective agent in the reduction of dental caries. High speed cutting devices, an impossibility in the past, have become a primary adjunct in restorative dental procedures. These are but two examples of the inescapable impact that research has had on the practice of dentistry. It is reasonable to assume that the practice of dentistry will be vastly changed because of scientific and technologic revolution.

Because of these inevitable changes, it is imperative that all areas of dental education be reevaluated and designed to meet the demands of society in future years. If dentistry is to progress, then dental educational experiences must be designed to prepare the graduate for the practice of dentistry not only in accordance with today's standards, but also be designed to fit those foreseeable advances that will be applicable twenty and forty years hence.

The School of Dentistry at the University of Maryland, being cognizant of its heritage as the first dental college in the world, is also aware of its responsibilities to provide an educational environment to meet emerging professional demands expected by the profession. It is because of this awareness of dentistry's future that the programs and curricula presented on the following pages have been developed. They are designed to educate a

technically capable, biologically oriented and socially conscious dentist who is unequivocally aware of his relationship to and dependence upon a health team effort.

On March 6, 1965 the School celebrated the 125th anniversary of its founding as the Baltimore College of Dental Surgery and began another increment in a life of service. It was entirely appropriate that at this point in the continuing development of the School, the faculty was actively at work planning for a new academic program and a new physical facility. In their attempt to reach for a margin of excellence in dental education, faculty planners have evolved a number of new ideas. These have been encompassed into a concept which calls for the development of a University Dental Health Center.

In order to make a beginning toward creation of the Dental Health Center the faculty outlined and adopted a series of objectives to give direction and meaning to the work which was to follow. Because these objectives represent a rededication of the University's dental educational program and are therefore the guidelines to present innovations in every aspect of the school's life, they are presented in complete form below.

"The dedicated and guiding purpose of this School is the firm establishment of an academic environment founded on three basic aims: the highest quality of instruction in dental art and science; an atmosphere of investigative spirit; and an abiding attention to the service obligations incumbent on the dental profession. Further, the interdependence of these fundamental goals—teaching, research



service—will be of primary consideration in all aspects of faculty and student life in order that this program of dental education will be an integral part of the greater University of Maryland.

To define more clearly these essential objectives the following statements of basic aims and purposes are presented:

- To remain ever sensitive to the dental needs of the area which the School serves; to provide well-educated dental practitioners to meet the dental health needs of the State of Maryland and to contribute an equitable share of such graduates to national dental manpower needs.
- To maintain and continually seek to improve an accepted course of instruction for dental students so that the ever-changing concepts and methods of modern dental practice will be included in the overall educational program as well as in individual course design.
- To establish a program for education and training of auxiliary personnel, and to inculcate in these students as well as dental students an understanding of their proper role and mutual dependence within the framework of the dental profession.
- To qualitatively and to quantitatively extend the program of graduate studies so that more and better educated individuals may be provided to the ranks of dental and other health science educators by thorough recruitment of qualified candidates for graduate degrees.
- To initiate appropriate courses of instruction in the clinical disciplines of dentistry which are represented by specialty boards and to

prepare candidates to qualify for certification by such boards.

- To admit to the School or any divisions thereof only those persons who have demonstrated high academic achievement in preparation for their professional education; who exhibit the high qualities of moral integrity required in a professional career; and who in all respects give promise of becoming successful students and members of good standing in their profession.
- To encourage in all segments of the School's student body a thirst for new knowledge, a spirit of industry and a desire to participate in various student organizations as they may be related to the welfare of the student body and the maintenance of good student-faculty rapport.
- To initiate an understanding by the student, the strength of which shall be nurtured during his academic years, of the many non-professional obligations he will be expected to assume upon his becoming a member of the dental profession; efficacious participation in the cultural, social, religious and civic activities of his community, with a particular responsibility for adopting a course of thinking which will result in a constant awareness of the needs of the public which he will serve.
- To foster in the student by faculty example and all other means available a cognizance of the benefits to be derived from a vital and habitual interest in the perpetuating values of the scientific literature with the intent that he may preserve and exercise this interest throughout his professional career.



- To impress upon the student his obligation to membership and participation in local, state and national dental organizations so that he may individually express his loyalty to his profession and promote its best interests.
- To prepare the student to become a dedicated alumnus so that he may lend his enthusiastic interest and support to the activities of his University and its alumni organization.
- To organize and to pursue effectively a program of continuation education by providing regularly scheduled refresher courses for the dental practitioners of Maryland and its neighboring states.
- To provide a faculty that will by general design and individual purpose present a manner of professional conduct and a spirit of dedicated application to their responsibilities so that they will assure the superior education of their students.
- To provide, furthermore, a faculty who will present a curriculum of quality and who will continually seek better methods of instruction by self-appraisal and by curriculum study and experimentation.
- To promote on the part of both faculty and students a sincere appreciation for the benefits to be derived from a strong program of research in fundamental, applied and clinical sciences as they relate to improved methods of patient care and better instructional procedures.
- To afford to each laboratory and clinic the best available equipment and materials for the proper and effective training of all students in the exercise of the many procedures that are applicable in the practice of the art and science of dentistry.
- To provide to the community and the state a diagnostic and treatment center for alleviation of oral disease, and to offer consultation service to any member of the health professions of the State of Maryland.
- To establish a program of teaching dental care for that segment of the population which is physically or mentally handicapped and might otherwise be denied treatment.
- To inculcate in the student a recognition and acceptance of the concepts of preventive dentistry so that he may by his practice methods and by his advocacy of patient participation contribute to the oral and general health of the community which he will serve.
- To cultivate in the student a knowledge of the history of dentistry and an appreciation of the contributions made throughout the centuries to progress in the art and science of dentistry; to develop in him an awareness of dentistry's historical relationship with the scientific, economic and social factors of mankind's advancement; to make the student especially cognizant of the heritage and of the pioneering influence offered by this School as the first dental college in the world; and to instill in the student a feeling of deep respect for the varied and ever-improving services of dentistry in the alleviation and correction of the physical and mental afflictions of mankind."

#### EDUCATIONAL PHILOSOPHY

With the recognition that the objectives just enumerated indicate an expansion of the School's responsibilities



to improve dental health, it becomes abundantly clear that there should be a transition of the dental school from an educational institution oriented along traditional lines to a Dental Health Center planned so that individuals could receive educational experiences which would help develop them into members of a dental health team. This team—a professional group of dentists, specialists, educators, researchers and subprofessional personnel—should be prepared to render comprehensive dental services of superior quality to the public and to other health professions.

The successful synthesis of a Dental Health Center at the University of Maryland requires cooperative union of three key components—the academician, his student, and their patient.

*The Academician:* Because the continuum of an educational program is dependent upon its faculty, it is our intent to continue recruiting to this faculty individuals who have primary interests in students and sound pedagogical principles. It has long been accepted in educational circles that the best teaching is by example. This is especially germane to professional education where so much instruction is performed on a tutorial basis. It is, therefore, our vital responsibility to procure teachers who have qualities which stimulate in their students a strong desire for emulation. While the teacher must exhibit competence in his field, he must also have a thorough understanding of the psychology of learning in general, and specifically, he must convey to his students the relationship between his subject and the broad spectrum of the health sciences.

In addition to his attributes as a teacher, the faculty member must possess a sense of curiosity in order to contribute toward the development and sustenance of an active research program. Experience dictates that the better teacher is the one who is keenly aware of the limitations of present day knowledge and who possesses an investigative interest in the unknown. Research on the part of the faculty should be broadened to include investigations in the biologic sciences, the physical sciences, the educational process itself and the social and behavioral sciences. These programs of research fit into three interrelated categories—fundamental, applied and clinical. The Center's educational concepts will insist that all students receive exposure to these types of investigative endeavor so as to preclude the sterility which will most assuredly result if teaching and research are compartmentalized.

*The Student:* As a public institution the University of Maryland has an obligation to satisfy the needs for dental manpower of all types in the State. Indeed, with the ever growing demands from the national dental manpower pool, it has the added responsibility to meet these needs also. With respect to admissions, emphasis will be placed on selection of students who demonstrate a strong motivation for human service. Previous academic achievement and development of intellectual ability, while important modalities in evaluation of prospective students, should not be considered as the only means of gaining admission to the School of Dentistry. Once the class has been selected and enrolled it should receive the treatment accorded mature and responsible persons who



will be called upon to exercise good professional judgment based on solid scientific principles. In spite of highly selective methods of choosing students, there will be those who need additional time and attention to grasp the varied situations encountered in dental education and practice. The School should provide, when indicated, resources for counselling and aid to these students. In this regard the faculty and administration of the School should be constantly on the alert for impending financial difficulties or other personal problems which interfere with a student's ability to perform. Throughout his experience in the learning situation the student must be made constantly aware of his obligations as a future professional person. He must be imbued with the importance of continuing education programs through exposure to some of these exercises prior to his graduation; he must understand that dental education only begins when he receives his degree; and he must be aware of the role of organized dentistry and his contribution through it to society at large. Unscheduled time should be extended to all students so they may have free time for independent work, research, electives or just "quiet time" for gathering their thoughts and assimilating knowledge. In short, the students should find themselves in an environment where a spirit of cooperation and understanding prevails and where they may develop high caliber professional attitudes.

*The Patient:* The nucleus of our program will be the dental student preparing for the general practice of dentistry either as a career or as a foundation for specialty practice or dental

education and research. He will be the hub around which will revolve the dental health team devoted to the highest standards of comprehensive oral health care based on preventive dentistry, thorough diagnosis and treatment planning. To achieve the formation of this team—the dentist, the dental specialist, the dental hygienist and the dental assistant—a number of patients who exhibit a broad spectrum of oral diseases must be available. While certain selectivity must be practiced in choosing patients for instructional purposes, we envision the Dental Health Center as a facility which will offer dental services to all segments of the population. Space is to be allocated to support programs of complete dental service to all ambulatory clinic patients, transportable patients who may be physically or mentally handicapped, indigent and semi-indigent patients as well as private patients seen on a referral basis in a faculty practice clinic. In addition, the Center will serve as a base from which professional services will be extended to other health related institutions in the area through a program of community dental services. Although this is a broadly based patient care program involving large numbers of professional and subprofessional personnel and patients, every effort will be made to inculcate in the members of the dental health team the importance of the personalized doctor-patient relationship and concern for the patient as an individual with human dignity.

It is the sincere hope of the faculty that this philosophy of education will motivate the student to develop a strong desire for continued self-evalu-



ation and, through this self-appraisal, instill in him a sincere and dedicated effort to be of maximum service to his patients, his profession and society in general. Through this constant attempt for greater self-improvement, the dental services rendered by the profession as a whole will play a significant role in strengthening dentistry's importance in the total health of the population, and will insure a place for dental education in the university community.

### CURRICULUM

There is a great deal of ferment in all fields of education today. Dental education is no exception. The great advances made in recent years in dentistry dictate that dental educators become increasingly critical of themselves, of their programs and of their products. The fountainhead of biologic and dental materials research has been the nation's schools of dentistry. It is the obligation of these same institutions to pursue actively programs of research in dental education. Without doubt, the numerous studies related to the physical and biologic sciences, as well as the new technical achievements, will provide new material for the dental curriculum. Also, they will offer a potential source for new and improved methods of teaching.

The focal point of the Dental Health Center must be the education of an undifferentiated dental practitioner through the medium of a curriculum around which will revolve all other programs operated in the Center. Fac-

ulty planners immediately took the view that before any definitive planning for a physical facility could be instituted, the program of dental education in its entirety should be critically examined from all aspects. This preliminary study of the curriculum, begun in April, 1963, culminated in unanimous agreement that the present curriculum had several inadequacies with respect to implementation of the objectives outlined earlier. As a first step, it was decided that the traditional departmental-oriented approach to teaching should yield to an academic program based on "units of instruction." As a result, the dental curriculum was restructured so that the freshman and sophomore years each contain four such units of instruction—Basic Biologic Science, Basic Dental Science, Community Dentistry and Conjoint Sciences. The third and fourth years were designed with units in Applied Basic Biologic Science, Clinical Dentistry, Community Dentistry, Conjoint Sciences and Electives. This curriculum is presented both in outline and blocked form on pages 56, 57 and 58. While separate disciplines are identified under each unit heading, the main purpose of their listing is to provide direction to unit study groups which continually define and refine the role and scope of each area. The groups are composed of faculty members who have been or may be responsible for instruction in these fields. They are further charged with the responsibility of defining unit objectives and methods for their accomplishment.



**FRESHMAN YEAR****UNIT 1.—*Basic Biologic Science***

Molecular Biology  
The Cell  
Ultrastructure  
Anatomy  
Gross Dissection  
Histology and Dental Embryology  
Biochemistry  
Physiology

**UNIT 2.—*Basic Dental Science***

Dental Materials  
Dental Anatomy  
Restorative Dentistry  
Introduction to Clinical Dentistry

**UNIT 3.—*Community Dentistry***

History of Dentistry and Community Health  
Epidemiology and Biostatistics  
Role of the Dentist in the Health Professions

**UNIT 4.—*Conjoint Sciences***

Growth and Development  
Genetics  
Preventive Dentistry  
Dental Literature

**SOPHOMORE YEAR****UNIT 1.—*Basic Biologic Science***

Physiology  
General Pathology  
Microbiology  
Pharmacology

**UNIT 2.—*Basic Dental Science***

Restorative Dentistry  
Endodontic and Periodontic Technic  
Orthodontic Technic  
Clinical Dentistry

**UNIT 3.—*Community Dentistry***

Epidemiology and Biostatistics  
Ethics and Jurisprudence  
Behavioral Science

**UNIT 4.—*Conjoint Sciences***

Occlusion  
Preventive Dentistry  
Introduction to Clinical Medicine  
Dental Literature  
Research  
Treatment Planning



**JUNIOR YEAR****UNIT 1.—***Applied Basic Biologic Science*

Gross Anatomy  
Histology  
Physiology  
Microbiology  
Biochemistry  
Oral Pathology

**UNIT 2.—***Clinical Dentistry*

Oral Medicine  
  Diagnosis and Radiology  
  Clinical Oral Pathology (includes Oncology and Hematology)  
  Periodontics  
  Endodontics  
Restorative Dentistry  
  Operative Dentistry  
  Fixed Prosthodontics  
Prosthodontics  
Pedodontics  
Orthodontics  
Oral Surgery  
Clinical Medicine

**UNIT 3.—***Community Dentistry*

Community Health  
Public Health Dentistry  
Behavioral Science  
Career Counselling

**UNIT 4.—***Conjoint Sciences*

Preventive Dentistry  
Treatment Planning  
Occlusion  
Dental Literature  
Research

**SENIOR YEAR****UNIT 1.—***Applied Basic Biologic Science*

Gross Anatomy  
Histology  
Physiology  
Microbiology  
Biochemistry

**UNIT 2.—***Clinical Dentistry*

General Practice  
Orthodontics  
Oral Surgery (includes Hospital Procedures)  
Diagnosis and Radiology  
Clinical Medicine (includes Hospital Ward Rounds)  
Oncology  
Hematology  
Physical Diagnosis

**UNIT 3.—***Community Dentistry*

Community Dental Health  
Behavioral Science  
Dental Economics and Practice Dynamics

**UNIT 4.—***Conjoint Sciences*

Preventive Dentistry  
Treatment Planning  
Occlusion  
Clinico-Pathologic Conference  
Dental Literature

**UNIT 5.—***Electives*

Specialty Practice  
Research



| FRESHMAN   |  |   | SOPHOMORE                         |                                       | JUNIOR                                  | SENIOR                                 |
|--|--|---|-----------------------------------|---------------------------------------|---|--|
| M<br>O<br>L<br>E<br>C<br>U<br>L<br>A<br>R<br>B<br>I<br>O<br>L<br>O<br>G<br>Y<br>A<br>N<br>D<br>H<br>I<br>S<br>T<br>O<br>R<br>Y | GROSS ANATOMY<br>(312 HRS.)            |   | PHYSIOLOGY<br>(154 HRS.)          | PHARMA-<br>COLOGY<br>(102 HRS.)       | APPLIED BASIC<br>SCIENCES<br>(136 HRS.) | APPLIED BASIC<br>SCIENCES (102 HRS.)   |
|  | HISTOLOGY<br>(160 HRS.)                | BIO-<br>CHEMIS-<br>TRY<br>(150<br>HRS.) | MICROBIOLOGY<br>(120 HRS.)        | GENERAL<br>PATHOLOGY<br>(108<br>HRS.) | ORAL<br>PATHOLOGY<br>(84 HRS.)          | CLINICAL<br>SCIENCES<br><br>(884 HRS.) |
|  |  | BASIC DENTAL<br>SCIENCES<br>(476 HRS.)  |                                   |                                       |   |  |
|  | BASIC DENTAL<br>SCIENCES<br>(334 HRS.) |   | CLINICAL<br>SCIENCES<br>(40 HRS.) | CLINICAL SCIENCES<br>(102 HRS.)       | CONJOINT SCIENCES<br>(136 HRS.)         | ELECTIVES (68 HRS.)                    |
| CONJOINT SCIENCES<br>(102 HRS.)  |  | CONJOINT SCIENCES<br>(136 HRS.)         |                                   | CONJOINT SCIENCES<br>(136 HRS.)       | CONJOINT SCIENCES<br>(102 HRS.)         |  |
| COMMUNITY DENTISTRY<br>(68 HRS.)   |  | COMMUNITY DENTISTRY<br>(68 HRS.)        |                                   | COMMUNITY DENTISTRY<br>(68 HRS.)      | COMMUNITY DENTISTRY<br>(68 HRS.)        |  |
| UNSCHEDULED TIME<br>(136 HRS.)   |  | UNSCHEDULED TIME<br>(136 HRS.)          |                                   | UNSCHEDULED TIME<br>(136 HRS.)        | UNSCHEDULED TIME<br>(136 HRS.)          |  |



By the way of further examination, the basic purpose of this structure of the curriculum is to promote both vertically and laterally, integration of all teaching material. The student's initiation to the biologic aspects of dental education will be a course in molecular biology which will include material presented by the Departments of Biochemistry, Histology and Physiology. This phase will deal with the cell and its ultrastructure making full use of such facilities as the electron microscope and tissue culture laboratories and will be preliminary to student exposure to the study of gross and microscopic structure and function of the human organism. Simultaneously, the student will begin his study of basic dental science. This unit, under the direction of a Coordinator of Basic Dental Science, will include material from those courses traditionally taught under the designation of oral anatomy, dental materials, prosthodontics, etc. The evaluation of the curriculum indicates that the combination of these disciplines will create sufficient time to allow freshman students to have contact with patients. Since the practice of dentistry is fundamentally concerned with human oral health problems, it logically follows that the student should be knowledgeable of all dimensions of human behavior early in his professional education. Early experience with patients will help him to understand dental problems; it should also make him more cognizant of the relationship of the biologic sciences to clinical practice and hopefully motivate him to better understanding of the close relationship between the two areas. The unit identified as Conjoint Sciences represents one of the

most exciting challenges in the new curriculum. This effort is envisioned as a conference-seminar type forum conducted by both biologic and clinical faculty from the same podium. There will be sessions focused on a patient-centered problem—temporomandibular joint syndrome—with discussions presented by the anatomist, physiologist, pathologist, restorative dentist, prosthodontist, periodontist, etc. Preventive Dentistry, because it belongs in all areas, will be organized through the conjoint sciences unit. The concept of teaching comprehensive dentistry is anchored in teaching a sound philosophy of prevention beginning on the day that the student enters school. Dental education has long been so involved with the development and perfection of mechanical procedures that prevention has been relegated to a relatively minor position in the total curriculum. Emphasis on principles of prevention of dental disease supported by sound biomechanical instruction will form an important phase of this program.

Dentistry is practiced in a community for the citizens who form that community. It follows then that dental education is a discipline which has been established to answer a community need—the education of dentists. If it is to fulfill its mission with complete success, the dental school must understand the biologic, social, economic and cultural factors which influence the community's response to the dentist and the dental services he is offering. The Community Dentistry unit in the curriculum is designed to inculcate in the student his service obligations, not only to patients as individuals, but to the community as well. It also intro-



duces him to "community dental practice" through a cooperative program with other institutions that care for the physically and mentally handicapped and other special population groups. The study of behavioral sciences forms an important part of this unit so that students will have some insight into human personality traits and how and why an individual or group reacts to the incidence and treatment of oral diseases. The base for a teaching program in community dentistry is the historical development of present patterns in the dental profession, their dependence on the other health professions and the principles of public health dentistry. The successful presentation of community dentistry as an instructional unit depends upon the synthesis of knowledge from a number of individuals representing a number of areas of higher education—the psychologist, the psychiatrist, the social worker, the public health dentist, the physician and the attorney as well as dental clinicians.

The second year in the projected curriculum is structured in a similar way to the first year with the same four units of instruction replacing departmentally oriented courses. The study of man and disease will be stressed by the inclusion of material embracing principles of pathologic physiology and microbiology. The basic dental science unit will cover actual dental therapeutic principles and procedures in both the laboratory and clinic settings. Again, it is the consensus of the faculty that the combining of the traditionally separate courses in operative dentistry, fixed and removable prosthodontics will provide sufficient time for a course in clinical den-

tistry using patients for instructional purposes. Conjoint sciences and community dentistry courses will be extended consistent with the advancing knowledge and acquisition of clinical skills by the students.

The third and fourth years will be devoted primarily to education in clinical dentistry reinforced by biologic principles. With the exception of oral diagnosis and radiology, community dentistry and oral surgery, which will be handled by a block assignment method, clinical teaching will be in a general practice environment where emphasis will be placed on comprehensive dental services rather than on a segmented departmental system. The adoption of this method of presentation of clinical dentistry has led to the formation of a multidisciplinary faculty and a form of team teaching. Junior and senior students will be permanently assigned to clinic cubicles and the faculty will come to them in the form of a teaching team, consisting of a representative each from the Departments of Oral Medicine, Fixed Prosthodontics, Removable Prosthodontics, Operative Dentistry, Orthodontics and Pedodontics. The team will be responsible for a working diagnosis, treatment planning and sequential accomplishment of all therapeutic procedures for each patient. In order that clinical instruction be made more meaningful, basic biologic science teaching will be "diagonalized" so that it will extend into the years traditionally reserved for clinical teaching. Third- and fourth-year students will be returned to the basic science laboratory for instruction in applied basic sciences. These applied courses in the basic sciences will be offered as credit



courses to emphasize their importance to the clinical practice of dentistry. The content of conjoint sciences for clinical students will be similar to that offered in the first two years of the curriculum. Seminar type conferences will be arranged involving subject matter which will draw contributions of knowledge from both basic science and clinical teachers. In this instance, however, the tone of the conference will be more clinical in nature because major effort on the part of the students will be directed toward dental practice. Community Dentistry will likewise be expanded for juniors and seniors by the inclusion of community dental practice in the teaching program. Both intramural and extramural activities will be utilized. For the former a community dentistry clinic within the Dental Health Center is planned where students may perform dental services for selected patients who do not fit the usual pattern of clinical teaching material. Handicapped, but transportable, patients of all ages with a variety of dental problems will be treated in this clinic. Extramural community dental practice will include student visits to other institutions. Exposure to working dental clinics and other facilities identified as dental public health areas will be included in the extramural program. The aim of this aspect of community dentistry is to make the students more aware of the dental needs of population groups who do not normally come under the purview of the private practitioner. Indeed, because many of these facilities are staffed in part by private practitioners, it is hoped that the student will see his obligation to participate

in these important activities in the future.

In the fourth year an additional unit designated as Electives is listed. Time will be provided so that a senior student may receive additional experience in an area in which he may have special interest or talent. Since the program of undergraduate student research fellows supported by the U.S. Public Health Service is largely limited to the summer months, it is hoped that the provision for this elective time will allow and encourage students to participate more actively in research during the regular academic session. Once a trend of interest can be established, relative to students' interest in the pursuit of electives, the electives will be formalized to the degree that academic credit may be earned.

Throughout the entire four years, a block of unscheduled time is included. While this is not listed on the curriculum as outlined above, it is shown on the blocked-out curriculum illustrated on page 58. It is an accepted principle that no two individuals progress at the same rate. Remedial work by slow students may be performed during these periods. In addition, all students should have some free time for reflection, organizing their knowledge or simply "catching their breath." Successful pursuit of the dental curriculum is an arduous task, and time must be provided to enable the student to remove himself temporarily from the strains and rigors of his education. Although it is not the role of the Dental Health Center to provide educational needs in the cultural fields, one can and should encourage dental students as much as possible in these areas. As part of a large university



and a large metropolitan area, many opportunities exist for students to broaden themselves in the humanities and arts. Students should attend and participate in these activities.

An entering class size of 128 undergraduate dental students is proposed. The projected class size for each program is as follows:

1. Undergraduate dental students .....128 per year
2. Graduate students, basic sciences .....63 (total) \*
3. Postgraduate students, clinical sciences ..... 50 (total) \*
4. Dental Auxiliary students
  - (a) Assistants ..... 64 per year
  - (b) Hygienists ..... 48 per year

\* The total number of students projected for graduate education is based on a formula of 9 students per basic science department with 3 entering each year for a 3-year Ph.D program. Likewise, the postgraduate student enrollment figure is derived as total enrollment with 5 students per year entering each department on a 2-year certification program.

Fundamental to the creation of a Dental Health Center is the requirement that a number of academic activities surround and support the education of dentists. Perhaps one's thoughts in this connection may be expressed best by the schematic representation of the concept of a total program in dental education on page 63. One can note that all activities illustrated as peripheral are focused entirely on undergraduate dental education as a means of fortifying this program. Each of these activities and its relationship to the undergraduate dental student program is to be presented in more detail. Since the undergraduate dental curriculum will be transformed from departmental to unit teaching,

the description that follows is couched in broad terminology and outlines thoughts relative to the content of each unit rather than each course.

With reference to the other academic activities, the efforts in graduate education will serve to increase research activities as well as provide for additional teaching staff through the use of graduate students as assistants in the undergraduate teaching program. Similarly, postgraduate students will serve as clinical teaching assistants with dental students so that they, the postgraduate students, will receive a more comprehensive education. In addition, postgraduate clinics manned by postgraduate students will function as a resource for clinical problems requiring the attention of a specialist. Practical preventive dental practice will be emphasized by routing all patients through a special preventive dentistry clinic for oral hygiene counselling and preliminary treatment by student dental hygienists working in cooperation with dental students. Dental assistants will be assigned to senior dental students to illustrate the importance and the necessity of this auxiliary to successful clinical dental practice.

#### DENTAL UNDERGRADUATE PROGRAM

As stated in a previous section, the undergraduate program of instruction will not follow the conventional horizontal approach to teaching. The curriculum chart on page 58 demonstrates the projected diagonalization of the program. It has been pointed out also that one of the purposes of this newly adopted curriculum outline is to allow



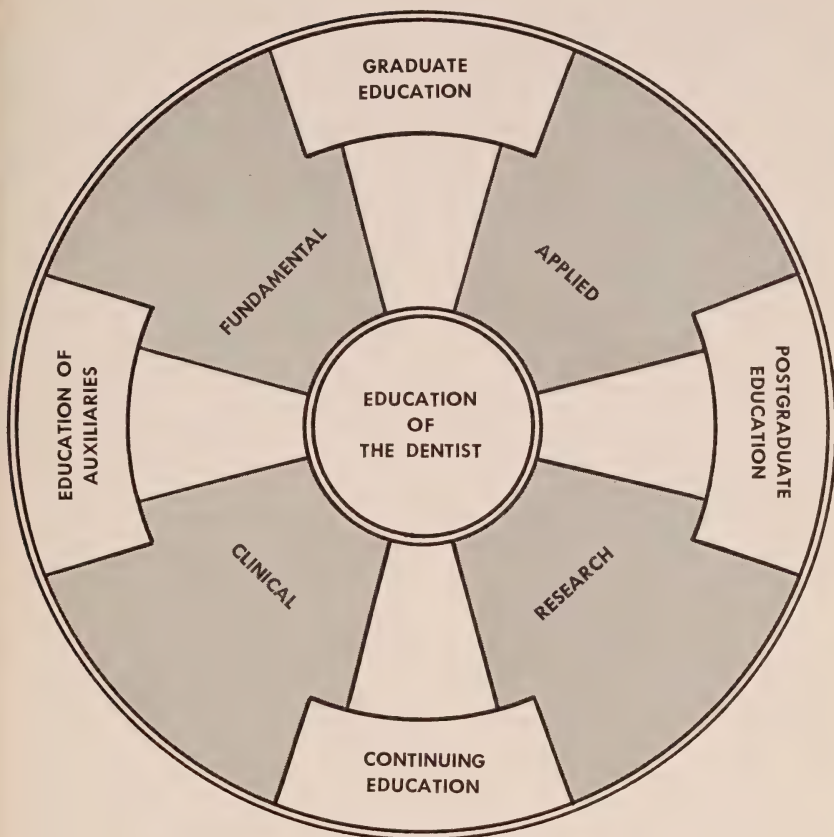


Fig. 2



for a better correlation between all courses, resulting in an educational experience that emphasizes the importance and interrelationship of the various learning experiences necessary for rendering comprehensive dental services. Thus, units of instruction are designed to group together those courses and/or subjects that are closely related and hence should be taught with a more systematic and correlated approach. The program in general will have enough flexibility that courses and subjects may be shortened or lengthened in accordance with existing needs. Courses will not be expanded or condensed unnecessarily to meet semester requirements; nor will they be taught with a terminal approach, but will be presented as integral entities of the total program. Consequently, the knowledge derived from all areas will be applied continuously in the daily practice of dentistry.

#### A. Basic Biologic Sciences

##### 1. *Scope and Time.*

This unit at the freshman level will utilize 20 hours per week of instruction for the entire year. The first 40 hours will be devoted to a course in molecular biology which will include material from the microanatomy, biochemistry and physiology areas. This initial exposure to cellular structure and function will provide a background for further studies in all biologic sciences. Upon completion of this introductory course the program follows with concurrent studies in gross anatomy, histology, embryology and neuroanatomy. These courses will be related as much as possible to provide for the student the microscopic structure of a system, organ or tissue while gross

dissection is being performed. It is apparent, however, that total correlation is almost impossible and to a great degree impractical but, whenever possible, it will be attempted. As the relationship is now envisioned, histology will deal with basic concepts in inheritance and embryonic development (histogenesis and organogenesis). While gross anatomy will be concerned with the upper limbs, histology will be concerned with the microscopic study of basic tissues. In the next several weeks of instruction both courses will be dealing with organ systems, and a concerted effort will be made towards maximum correlation. During the last few weeks histology will deal exclusively with oral tissues while the Anatomy Department will present a comprehensive course in the anatomy of the head and neck. The final weeks of anatomy will be concerned with neuroanatomy. The time spent to present these two courses (macro- and microanatomy) will approximate 470 hours during the year.

Just prior to the completion of the course in neuroanatomy, the Department of Biochemistry will begin its presentation of a course which will stress general principles. Dental applications will be utilized whenever possible. Physical-chemical principles, including a discussion of the colloidal state, will be utilized as an introduction in the course for a background of knowledge on which the remainder of the subjects are based. Carbohydrates, lipids, proteins, amino acids, and nucleic acids will be discussed. Foods, mineral and energy metabolism, vitamins, hormones and enzymes will be covered in detail. Digestion, absorption, detoxication, and interme-



diary metabolism for each of the three main food classes will be considered. In order to provide background and knowledge of the relationship between prevention and treatment of oral diseases and various deficiency states, the science of nutrition will be presented. A thorough study of blood, acid-base balance and urine with emphasis upon their importance in dental practice will conclude this basic material in biochemistry. The time devoted for its presentation will be approximately 150 hours.

During the last few weeks of the year the department of physiology will present the first phase of a course in physiology which will continue through part of the sophomore year. This introduction to physiology will deal primarily with fundamental and basic physiological considerations and is designed to broaden the knowledge acquired in biochemistry and in anatomy. Total time spent will be 18 hours in the freshman year.

Physiology will continue into the sophomore year with a broadening of the basic information on cellular physiology presented at the end of the freshman year. The material will be a logical outgrowth of the work in molecular biology and will be correlated with the instruction presented in histology and neuroanatomy. The major portion of the course will deal with studies of the basic properties of heart, nerve and skeletal muscle, mammalian studies in circulation, respiration, renal function, etc., together with the role played by the autonomic nervous system in controlling each of these functions, and studies in human reflex activity, special senses, salivary func-

tion, etc. Total time spent in the sophomore year will be 136 hours.

Concurrent with the course in physiology, the student will be exposed to a comprehensive approach to general and dental microbiology. This course is intended to make the student cognizant of the chemical and biological mechanisms of the production of disease by bacteria and other plant and animal parasites and the means by which the animal and plant hosts defend themselves against bacteria and related organisms. The student should be able to understand and appreciate the part played by microorganisms in the production of diseases; to use microbiologic methods in the prevention, diagnosis and treatment of oral diseases; to acquire the necessary "sense of asepsis" so important in the practice of dentistry; and to understand the application of microbiologic methods to the community control of disease. The time spent in microbiology will be approximately 120 hours.

Following the courses in physiology and microbiology, the student will be exposed to courses in pharmacology and pathology. The primary objectives of the course in pharmacology are to provide a general survey of the science of pharmacology and pharmacodynamics; to provide knowledge of those drugs which have special interest in the practice of dentistry; to teach the application of drugs to the practice of dentistry (therapeutics); to teach the use of drugs in the treatment of specific disease conditions of the oral cavity. Total time spent for this course will be 102 hours.

The formal course in pathology will begin at the sophomore level and continue into the junior year. The teach-



ing of pathology is viewed as a multidisciplinary effort in that variations from normal anatomy, physiology and biochemistry are used to explain the disease processes and the rationale for treatment. The pathology course in this unit will cover in detail the characteristics and features of inflammation and repair, neoplasia, and degenerative and metabolic diseases. Emphasis will be placed on detailed instruction in the nature and characteristics of disease of the skin, skeletal, cardiovascular, respiratory and hematopoietic systems, and the diseases of the teeth and their supporting structures. In addition, the course will include the important features of diseases of other organs and organ systems that have significance in everyday health problems and in the practice of dentistry. Although histopathology will be one of the teaching tools throughout the courses, principal emphasis will be on clinicopathologic relationships. The course, including general and oral pathology (second and third years) will be allotted 192 hours.

During the junior (136 hours) and senior (102 hours) years, a course in applied basic sciences will be presented. The purpose of this unit is to correlate further the information obtained in the basic sciences with clinical problems. Applied basic science sessions will be correlated with clinical problems in (1) head and neck anatomy, for example, facial planes and spaces as they may relate to oral infections, and temporomandibular joint disturbances and the anatomy involved; (2) the physiology and biochemistry of deglutition and saliva; (3) the role of microorganisms in specific and general periodontal problems

and dental caries etiology and control. This particular unit in the curriculum is expected to eliminate the attitude on the part of dental students that basic biologic sciences lose their importance in clinical dentistry.

## *2. Methodology of Teaching*

A variety of instructional procedures will be employed during the presentation of this unit. Laboratory exercises with student participation will account for the greatest bulk of the methods employed. However, lectures, demonstrations and seminars will be utilized often. Audio-visual aids (television, slides, charts, models, etc.) will be used whenever the situation or exercise warrants their use. Live television and video-tapes will become integral parts of the program and will be used extensively in all areas. The use of television as an image amplifier will become an invaluable means for on-the-spot teaching, especially in the laboratory setting.

Enough flexibility in the curriculum will be provided so that experimentation in course content as well as in teaching methods can be instituted. The use of programmed teaching and teaching machines may be effectively attempted in several phases of this unit of instruction. An open mind will always be maintained since educational methods change with the characteristics of the student groups and the nature of the material presented.

## *3. Staff and Staffing Patterns*

Each department within this unit (Histology and Embryology, Anatomy, Biochemistry, Physiology, Pharmacology, Microbiology and Pathology) will be staffed with a minimum of 6 full



time individuals or their equivalents to provide the necessary nucleus for efficient teaching and other departmental activities. Graduate programs will also be conducted in these departments, and it is projected that the number of graduate students will be about 8-10 per department. Graduate students will become an integral part of the undergraduate teaching program, particularly during the laboratory sessions. The manpower available for teaching purposes will permit a 1:16 ratio of teacher to students, and in some instances when a particular exercise demands it, the ratio can be lowered to 1:8. These ratios should enhance the teaching of all phases of biological sciences.

## B. Basic Dental Sciences

### 1. *Scope and Time*

This unit at the freshman level utilizes 11 hours of instruction per week for the entire year and will be designed to develop skills through technical exercises in order to prepare the student for the execution of clinical treatment procedures. The unit continues through the second year with the presentation of more involved biomechanical procedures. The first year deals primarily with basic information, principles and simpler technical exercises.

The first half of the freshman year, as it is presently planned, will include dental anatomy, dental materials, physical principles of cavity preparation and instrumentation as well as physical principles of restorative dentistry. Instruction with both high speed and conventional speed cutting instruments will be included. The second half will deal with basic princi-

ples of cavity design for intracoronal preparations for permanent and deciduous dentitions; with manipulative techniques for handling restorative materials; with an introduction of basic concepts in periodontal therapy; and with an introduction of the basic concepts for the treatment of complete and partially edentulous arches.

This unit is designed to provide for the student a comprehensive approach to patient care with emphasis upon sound biomechanical principles. It will be presented correlating information and concepts in histology, anatomy, physiology and other biological sciences. It will emphasize the importance of the periodontium and supporting tissues to the teeth and their morphology, the inter- and intra-arch relationships and their relationship to other human tissues. It will deal with the importance of early recognition of oral disturbances, prevention of such conditions, diagnostic principles and treatment procedures. The orientation of the student to a systematic approach to treatment sequence in all phases of restorative dentistry will supersede in importance the technical procedures.

Forty hours of this unit within the freshman year will be devoted to clinical dentistry. The student will examine patients to become acquainted with the oral structures; he will study growth and development by observation and assignment of selected patients through his four years of study; he will perform preventive procedures such as mouth debridement and topical fluoride applications; and he will receive early orientation to the magnitude of dental health problems. This clinical exposure is intended also to



make the student's total preclinical experience, especially the biologic sciences, more meaningful.

The unit in basic dental sciences will continue into the sophomore year utilizing 14 hours per week for a total of 476 hours per year. The material will be again presented with a systematic approach to inculcate in the student the need for total patient care and proper treatment sequence. The course will include (1) correlation of the developing concepts of occlusion, as taught in conjoint sciences, to technic procedures for edentulous patients, particularly as they relate to temporomandibular considerations; (2) extension of the basic concepts of cavity design to cover more advanced aspects of cavity preparations and restorations; (3) introduction to extracoronary designs (both complete and partial veneer), dowel preparation, porcelain jacket, pin retention in all aspects with special emphasis on the biomechanical requirements for abutment preparations; (4) correlation of the concepts in growth and development from conjoint sciences for basic procedures in orthodontic treatment and appliance construction; (5) introduction to endodontic technics with due consideration to the biologic implications; (6) construction of prosthetic appliances of all essential basic designs; (7) manipulation of all necessary dental materials for the construction of restorations and prosthetic devices.

Clinical experience (102 hours) for sophomores will be presented concurrently with the basic dental science unit and will be a continuation of the experience gained during the 40 clinic hours of the first year. Students will

be scheduled in block assignments to the clinics and perform simple restorative procedures directly related to the technic experiences being learned in basic dental science laboratories. Preventive procedures and growth and development studies will continue to occupy the student's time, but the experience will be augmented with more detailed information on oral examination, diagnosis, and the performance of simple restorative services. Sophomores may be assigned also to senior students to observe and to assist in selected clinical exercises.

## *2. Methodology of Teaching*

As in the previous unit, a variety of instructional methods will be used. Paramount among these will be the laboratory exercises wherein the student will (1) carve individual teeth and study their relationship in centric occlusion on an articulator; (2) prepare intracoronary preparations of elementary design on occluding dentofoms; (3) manipulate restorative materials and restore previously prepared cavity forms, (4) develop study casts for study of growth and development.

Lectures, seminars, audio-visual methods and the preceptorship approach will also be employed to an extensive degree. The use of television will augment all technical demonstrations and will be supplemented by individual instruction and supervision. Preceptorship type teaching will be employed during clinical experience when students must have close supervision. It will be employed for overseeing the preventive treatments performed on patients and for instructing those freshmen working with seniors in clinical procedures.



### 3. Staff and Staffing Patterns

This unit of instruction utilizes the services of various departments (Diagnosis and Radiology, Operative Dentis-

try, Removable Prosthodontics, Fixed Prosthodontics, Oral Medicine, Pedodontics, Orthodontics). The staff projected is shown in the following chart:

| CLINICAL DEPARTMENTS                                 |           |           |                          |
|--|-----------|-----------|--------------------------|
| Department   | Full time | Half time | Full time<br>Equivalents |
| Diagnosis and Radiology.....                         | 7         | 4         | 9                        |
| Operative Dentistry.....                             | 13        | 16        | 21                       |
| Oral Medicine.....<br>(Periodontics and Endodontics) | 11        | 8         | 15                       |
| Removable Prosthodontics.....                        | 11        | 8         | 15                       |
| Fixed Prosthodontics.....                            | 11        | 8         | 15                       |
| Orthodontics.....                                    | 4         | 2         | 5                        |
| Oral Surgery.....                                    | 6         | 2         | 7                        |
| Pedodontics.....                                     | 7         | 4         | 9                        |
| Community Dentistry.....                             | 1         | 2         | 2                        |
| Totals.....  | 71        | 54        | 98                       |

During the course of instruction for this unit in the curriculum the teacher to student ratio will be at least 1:16, particularly during laboratory exercises. There may be occasions when a smaller ratio (1:8) may be needed for specific teaching situations. Enough staff is contemplated to provide this flexibility. A ratio of 1:8 will be maintained in order to provide individual attention and supervision when students execute clinical procedures.

Those clinical departments (Endodontics, Periodontics, Orthodontics,

Prosthodontics, Surgery, Pedodontics) conducting postgraduate programs will utilize the services, on a part-time basis, of their postgraduate students in the instructional program for the undergraduate. These postgraduate students, who are training in a specialty field, will become an important asset in providing additional depth of instruction to the undergraduate student. Their services will be utilized in much the same manner as graduate assistants are used in the basic science disciplines.



### C. CLINICAL DENTISTRY

#### 1. *Scope and Time*

This unit in the curriculum involves the greatest bulk of time in the junior (776 hours) and senior (884 hours) years. It actually begins during the freshman and sophomore years with an introduction to clinical dentistry, particularly oral examination, preventive procedures and studies in growth and development; however, the major portion of clinical experience is gained by the student during his last two years.

The primary objectives of the unit in clinical dentistry involve the diagnosis of oral diseases and a rational plan of treatment to cope with these pathologic states. These objectives can best be reached through a program involving the teaching of total oral treatment based on sound biologic and technical knowledge.

It is our concept that diagnosis will be the discipline in which the student will be introduced to clinical dentistry. Logically, the art of diagnosis is dependent upon the ability of the student to utilize knowledge learned in the basic sciences for an understanding of tissue changes and how they are represented in the diseased state. It is illogical to expect students to gather a storehouse of information concerning health and disease, categorize it, and then at a later date call upon this wealth of material and utilize it comprehensively. The transference of this knowledge can be accomplished best by using it in conjunction with early contact with clinical dentistry. Since the initial exercise in the treatment of disease depends upon diagnosing the problem, it is conceived that students in the freshman year

will have the opportunity to examine the oral cavity. Although they may not be capable of programming a course of treatment, they will, by inspection, gain a fuller understanding of the gradation of deviation from accepted normal responses. They will be able to recognize anatomic deviations, tooth loss and mobility, gross carious lesions and other such attendant conditions which are associated with oral breakdown. One might feel that to present this picture to the student early in his training would tend to overwhelm him and leave him with a sense of helplessness. On the contrary, it is our opinion that one must fully indoctrinate the student as early as possible to the enormity of the scope of his profession.

Once the student has been made aware of the problems facing him as a future dentist, he will be called upon to see his patient as a dentally ill person rather than a means of meeting departmental or other specific requirements. Not only must he be able to understand the need for complete diagnosis, but he must be capable also of evolving a treatment plan in a sequence which will tend to render the greatest service to the patient. It is imperative that patients desiring dental care at the Center not be classified routinely as belonging in one clinical area or another. On the contrary, if we have dedicated ourselves to total dental care, we must initiate this plan at the first visit. Once the patient has been registered and admitted, a complete medical and dental history will be taken, a thorough oral examination made, and all other indicated diagnostic procedures carried out. During the course of diagnosis those patients who



appear to warrant further study from a medical aspect will be directed to the appropriate individual for this follow-up course. Patients whose oral condition is one which appears to be suited for teaching purposes will be assigned to a student for complete treatment. The student will assemble all information gathered during the diagnostic visit, as well as other reports that may be necessary to completely evaluate the patient. It will be the responsibility of the student to design a course of treatment that will encompass whatever needs are indicated in the particular case. It is after the treatment plan has been worked out by the student that a presentation of projected therapy will be held.

Our philosophy dictates that the student must be made to depend on the background of fundamentals learned in the basic biologic and dental sciences and from these fundamentals apply them, with sound judgment, to a plan of treatment consistent with the concept of total oral care. When the plan of treatment has been outlined, the student will present it to a treatment planning board. The board will consist of representatives from the departments of oral diagnosis, oral medicine, operative dentistry, fixed prosthodontics and removable prosthodontics. If a case warrants consultation from other departments, the individuals concerned will be asked to serve on the board. The student will present the case to the board with his plan of treatment. It will be necessary for him to defend his diagnosis and his choice of treatment. He will discuss the problem from all aspects — professional, social and economic — and will indicate his plan based on available information. The

treatment planning board will serve as a consultative as well as a reviewing body, and will approve, advise or change the proposed outlined course of treatment. Aspects of treatment will be discussed by various members of the board and, in many instances, the variations in treatment will evoke points of differences between members of the board. The student, as well as other students in attendance, will derive from these discussions a greater insight into the problems of each case presented. He will be made more acutely aware of the need for viewing problems from many aspects and will in turn learn to appreciate the importance of all phases of dentistry. He will perceive that at the level of treatment planning certain situations may exist which will affect an ideal course of therapy. One of the most important aspects of the reviewing board will be to decide finally, with the student, exactly what will be attempted in each clinical area. It is felt that a thorough evaluation at this time will preclude the wasted motion so often seen when students are required to seek consultations in departmentalized clinics.

Representatives of the departments involved will be rotated through the treatment planning sessions so that the student will be exposed to various philosophies within the same department. Although he may not present cases to every man in the department, he will by his scheduled attendance have the opportunity to hear all views. It is imperative that approaches to treatment not be dogmatic, rather that vistas to good dentistry have more than one avenue. It is the purpose of the treatment planning board to serve as a teaching instrument where differ-



ing opinions are invited provided they contribute to the goal of a definitive, well-planned course of treatment.

One of the primary purposes of the Center is to provide the State of Maryland as well as its neighboring areas with a well-educated dental practitioner capable of providing for general dental health needs. At the undergraduate level then, it is our philosophy that we can best serve this purpose by adopting the "general practice" approach to teaching. Since we have dedicated ourselves to this approach as indicated through the integrated treatment planning board, so will we continue to perpetuate this concept in clinical instruction. The student will be responsible for rendering *all* services essential to the treatment of the patient assigned to him. Unless there is a special problem, such as an oral surgical or an orthodontic one, the patient will be treated in the general practice clinic. Each patient will have a chart that is complete with respect to diagnosis, the approved treatment plan, and record sheets for all clinical disciplines. Radiographs, study casts and other information will be a part of the complete record.

The student will be assigned a clinic cubicle where he will perform all the services necessary for his patients. This area will serve as his office for a two-year period, much in the same manner as a dental office serves the general practitioner. Some differences will prevail, however, between the general practitioner's and the undergraduate's treatment procedures: (1) It will be necessary for the student to conduct a comprehensive program in patient education. Small conference areas will be available and will be fully

equipped with visual materials (models, charts, slides, filmstrips, etc.) for use in this important phase of patient treatment. (2) It is not expected that the student will perform oral surgery in this area and for this particular service the student will render the necessary treatment by appointment in the oral surgery clinic. (3) It is not expected to provide each student with an X-ray machine; hence if a radiograph is needed for endodontic therapy or other services, the student must use adjacent facilities for this purpose. (4) Also, it may be difficult for the student to handle unmanageable patients, particularly children, in the general practice clinic. Therefore, some facilities ("quiet-rooms") will be provided for use in the treatment of these patients.

Even though the student will render total care for his assigned patients in one area, it will be necessary for him to be exposed to other clinical facilities for a broadening of his total experience. Block assignments will be made to man the service departments (diagnosis and radiology and surgery). Students assigned to these areas will attend all treatment planning sessions, perform emergency care for patients in need, and render routine surgical care for those patients requiring it.

To broaden further the educational experience, students will be assigned to other specialty clinics where they can observe and assist members of the faculty, postgraduate students and visiting practitioners in rendering specialty type services. (1) The clinical facilities of the community dentistry program will be extremely valuable in helping students become aware of



community problems dealing with the handicapped, the non-ambulatory, the confined, and other patients requiring special care and management. The unit in Community Dentistry more fully describes the scope of this program. (2) The knowledge and experience derived in observing and assisting the full-time clinical members of the faculty in the conduct of their practice will provide for the undergraduate a broader scope in the specialty practiced. The student will recognize, through observation, the importance of one phase of dental care and how this phase is affected by other branches of dental service. It will afford the dental student the twofold advantage of learning the aspects of practice administration that are so important for a well-rounded education, and of observing a practice in operation.

With the earlier introduction of the student to clinical dentistry, it should be emphasized again that the initial experience will be one in keeping with the philosophy of prevention of dental disease. Students should be able to render fluoride treatments to individuals as well as perform initial debridements in an effort to preserve health in mouths when breakdown has not occurred. Correlation of these preventive measures along with the diagnosis and examination of gross dental disease gives the student graphic examples of what he is attempting to prevent. Appreciation for preventive dentistry shall be manifested throughout the entire clinical program.

It is the firm belief of the faculty that earlier introduction of the student to the clinic patient may facilitate the transition from laboratory technics to patient treatment. Often the student

performs laboratory procedures on manikins but experiences difficulty transferring this knowledge to the patient. Sophomore students, after thorough grounding in the basic principles of clinical dentistry, will be exposed to more simple procedures and then, as they show proficiency, advance to more highly technical procedures, gaining skill and confidence. In this manner it is conceivable that by the senior year many students will have completed a satisfactory course of training so as to free them for the pursuit of electives which are especially attractive to them. An example would be the student who might wish to return to fixed prosthodontics for more advanced training in this area, or perhaps the student who wishes to apply some aspect of biochemistry in a research project related to dental caries. This elective program will provide stimulus for the better student. A more thorough discussion of this topic may be found under the unit Electives. For the slower student it will obviously mean additional time for him to develop proficiency in clinical dentistry.

## *2. Methodology of Teaching*

A program such as outlined will require inherently very close supervision and direction by a faculty constantly aware of the needs and requirements of all concerned. It will not suffice that one individual be placed in charge as nominal clinic director and then let the program run itself. A coordinator responsible for the entire clinical teaching program must direct these endeavors. He must be grounded in the basic biological sciences to a point at which their practical application is a part of his total concept. However, he must be



able also to appreciate the importance of each phase of clinical dentistry and relegate none to an inferior position. He must support strong clinical departments, for it will be necessary to call on members from each department, not only for teaching, but also for consultative services. These men in turn will learn, by close cooperation between their own and other departments, of problems, pitfalls, and petty grievances which can be solved in a climate of mutual respect.

It must be emphasized that all conventional methods — lectures, conferences, seminars, demonstrations, etc. — with audio-visual aids (slides, charts, models, television, teaching machines, etc.) will be employed in the clinical program. A school-wide closed circuit television network is planned so that clinical areas as well as lecture halls, seminar rooms and laboratories will be equipped with monitors allowing interesting or unusual cases to be televised widely at any time during the day. These methods will supplement the individual, close supervision necessary when a patient is being treated. They will be useful also during the patient education program prior to and during patient treatment.

The teaching methodology in the general practice clinic, where students will perform the bulk of their patients' care, will be in keeping with the philosophy of total patient care. A "team" of four faculty members representing the clinical disciplines of fixed prosthodontics, removable prosthodontics, operative dentistry and oral medicine (periodontics and endodontics) will be assigned for a period of time (e.g., 8 weeks) to a module of 32 student cubicles. This team will be

similar in composition to the treatment planning board and will complement the work of the board. It will be the responsibility of this team to instruct and to evaluate students as they carry out their clinical training. Since the assignment of the team will be for a limited period of time, the student will gain exposure to numerous faculty members in the course of his clinical practice. It is felt that as the approved treatment plan is carried out, the need for revision will occur with some degree of frequency. As this situation arises, the members of the team and other faculty so involved will be available to cope with the exigency and settle it with little difficulty and waste of time for the student.

To this basic team of four teachers additional members will be added (pedodontist and orthodontist) to provide services during specified times or when required. Department heads and other consultants will be available when the team feels the complexity of or complications arising in the treatment of a patient warrant such consultation. This approach to teaching makes the student aware of the need for consultants and should expose him to the art of consultation.

Finally, it should be pointed out that to align better our undergraduate clinical teaching program with present-day methods of dental practice, the services of the dental laboratory technician will be used for cases which involve the fabrication of removable prosthodontic appliances. Once a student has demonstrated proficiency of knowledge and skills in the performance of these technic exercises, he will be allowed to prescribe his appliance needs to the laboratory much as the



graduate dentist does. It is our feeling that dental students' time should not be usurped by excessive hours at a polishing lathe, etc., when the emphasis in teaching prosthodontics should be on the biological design and function of the appliance.

One of the most difficult tasks in any clinical program is student evaluation. This responsibility will rest with the teaching team in the general practice clinic and with the individual teacher in the other clinical areas. Evaluation of student performance must be based not only on technics as they apply to clinical practice, but must include such factors as attitudes and motivation, professional deportment, and student-patient rapport. A systematic means of evaluating all these qualities will be developed. A computer programmed method is being designed to record accurately the performance of each student in the aforementioned categories. Each student will have a code number and will submit his coded IBM card to the staff member involved with the clinic procedure in question for grading as to quality of professional services, student attitude and professional conduct, etc. By marking appropriately in the designated areas and subsequent key punching, a permanent record can be established to be used later to tabulate, to compute and to analyze a number of items.

It is also possible, by using this system, to evaluate the teacher as well. Since he, too, will be coded and must designate himself as the evaluator on each procedure, one can determine how his students have performed as compared with those graded by other staff members for the same clinical procedures. Through the use of a computer,

the method outlined will offer a rapid means of data retrieval and tabulation so that the relative progress and class standing of any student can be analyzed periodically. This will allow the faculty to offer each student a balanced clinical experience, to counsel with slow students, or to redirect fast students. In order to process these data, a biostatistics section will be established within the Center for use in the undergraduate program. This section will be a satellite operation to the Computer Science Center of the University.

### *3. Staff and Staffing Patterns*

The chart on page 69 outlines the projected staff needs for all the clinical departments. These personnel will be supplemented by the part-time services of postgraduate students who are training in the various specialties (pedodontics, endodontics, orthodontics, prosthodontics, surgery and periodontics). It has been pointed out that the team concept of teaching in the general practice clinic employs the services of 4 teachers for 32 students. This arrangement allows for at least a 1:8 teacher to student ratio. When other teachers are added to the team to provide the depth of teaching necessary in some specialty areas, the ratio will be improved. At no time should it be greater than 1:8 for any phase of dental practice. Perhaps one of the most valuable features of the 4-man teaching team is the cross-fertilization of concepts among the four specialty or departmental areas represented. Since the teams will be assigned permanently together, excellent understanding and rapport and even substitution for one another can result.

An improved ratio will exist in the



service departments, diagnosis and radiology and surgery. Since one is dealing with small groups of assigned students in diagnosis and radiology and surgery, a 1:2 or 1:3 ratio can prevail in these areas of instruction. A one-one ratio will exist when students are assigned to specialty clinics since they will be assigned to a specific individual for preceptorship training.

#### *4. Relationship to Other Departments and Units*

Clinical dentistry as a unit of instruction will be closely associated and related to other units within the program. The teaching of clinical dentistry cannot be accomplished effectively without constant application of sound biological principles. Likewise, the total clinical program is dependent upon the combined efforts of all clinical departments. The team effort in general practice teaching is but one example of the close relationship that must exist. The opportunity for consultation with specialists is another example of the cooperative spirit and the sense of mutual respect that must be elicited in rendering the needed services to a patient.

Clinical dentistry will be an integral part of the efforts in the Conjoint Sciences unit as well as in the community dentistry program. These areas in the total curriculum will be presented by all departments in the school.

Oral surgery and clinical medicine will also utilize the facilities of the University Hospital and Mercy Hospital in addition to scheduled assignments within their own departments. The utilization of these facilities is necessary to provide for the student

experience in and an awareness of hospital care and procedures, particularly as they relate to the care of nonambulatory patients, maxillo-facial surgery, general anesthesia, etc. Dental and medical students may be brought together in the hospital also. Cooperation between the hospital medical and dental staffs will promote this concept in our teaching program. In addition, a physician will be on duty in the Oral Diagnosis Clinic of the Dental Health Center to improve the patient care program and to facilitate more effective dento-medical rapport.

#### **D. CONJOINT SCIENCES**

##### *1. Scope and Time*

This unit in the curriculum is designed to be one of the most important means for implementation of a correlated learning experience. It will be structured to bring together all biologic and clinical sciences in an effort to impress upon the student the importance of sound knowledge in all phases of the art and science of dentistry. Even though the time allotment is 3 hours per week for the first and fourth years and 4 hours per week for the second and third years the importance of the unit should not be underestimated. The total time for the four-year curriculum will be about 476 hours and may be adjusted upward as the program develops.

The most important subjects which lend themselves best for integrated teaching are preventive dentistry and occlusion. These two topics will comprise the bulk of the unit content. They will not be taught by a Department of Occlusion or Preventive Dentistry, but will be a conjoint effort in which all departments will participate.



The unit will be under the academic direction of the Coordinator of Clinical Sciences with the assistance of the Coordinators for Biologic Sciences and Basic Dental Science and the Department of Community Dentistry. Because this effort represents committee teaching, its success will require strong leadership.

Preventive dentistry will include epidemiology as it relates to dental caries, periodontal disease, malocclusion, anomalies, neoplasms, iatrogenic lesions and other oral diseases. It will deal with means of measuring caries activity, methods for caries prevention in individuals and in groups, the role of dental health education in the prevention of periodontal disease, the early detection of neoplasms and the importance of dental health to general body welfare.

The importance of preventive dentistry in all phases of restorative dentistry will be emphasized. The student will be made aware of the need for sound restorative procedures designed to prevent loss of function and to maintain the health of the oral tissues. Emphasis will be given to the restoration of physiological form and function in all restorative services for the preservation of the integrity of all supporting tissues. This part of the unit will also include information relative to the dental health team and the role of each member of the team in providing total dental care. Emphasis will be given also to the role of the dental hygienist in all programs dealing with preventive dentistry and patient education.

The subject of occlusion is usually considered under every departmental teaching program. By including it in the unit of Conjoint Sciences, it is ex-

pected that a better organization of material and hence an improved understanding of this important subject, will result. The objective is to relate available biologic and clinical information into a comprehensive analysis of occlusal relationships.

Occlusion will be presented during the four-year program beginning at the first-year level with basic information on growth and development, head and neck anatomy and interpretation of the morphology of the human dentition. Knowledge derived from histology, embryology, gross anatomy and dental anatomy will be correlated for a better understanding of occlusion. The second year will include information on the analysis of occlusion (static and dynamic), methods employed for the registration of jaw relations, the importance of diagnostic data, the need for sound periodontal health, the necessity of high quality restorative services and the effects of malocclusion. Theories of occlusion, development and choice of articulators and the need for a sound application of basic concepts and factual information in the solution of the individual problem of occlusion also will be discussed during the year. The last two years will deal with more advanced clinical problems requiring the need for remedial equilibration and prosthetic appliances. Recent instruments and modern methods for diagnosing and recording occlusal disharmonies (gnathological, neuromuscular recording mechanisms, neuromuscular dysfunction, proprioception and innervation related to mastication, etc.) will be discussed. The total presentation in occlusion will encompass all age groups from childhood through adulthood, to



the geriatric patient and will include the consideration of the complete dentition to the fully edentulous mouth.

In addition to these two basic subjects (preventive dentistry and occlusion) the unit in Conjoint Sciences will deal with the importance of and the need for research, the value of dental and allied health literature and the value of developing a plan of treatment based upon sound biologic and clinical knowledge.

## *2. Methodology of Teaching*

As in other units all conventional methods of teaching utilizing available audio-visual aids will be employed. However, the lecture and particularly the conference and seminar methods will be most useful in this unit. The use of patient-centered seminar discussions or conferences will provide the best means for teaching occlusion, preventive dentistry and treatment planning. For example, a seminar centered around a patient with occlusal dysfunction would require the presence of a physiologist, a pathologist, an anatomist, a clinician (prosthodontics and/or restorative dentistry), and/or a periodontist, orthodontist or other individuals knowledgeable in genetics and developmental biology. If the case in question were one of rampant caries, then a microbiologist, pathologist, biochemist, clinician (restorative dentistry) and other individuals as the case required it would be asked to participate in the presentation. These exercises will require carefully chosen and well prepared case presentations in the clinicopathologic conference format.

Research is listed in conjoint sciences since, as stated in the section on

educational philosophy, it will go hand in hand with the teaching program. Each faculty member will be expected to utilize recent research results in his teaching. In addition, he will strengthen this part of his program by frequent reference to the current literature. Basic principles of research methodology will be covered in lectures and seminar discussions.

For the purpose of teaching the importance of the literature as it relates to all phases of dental practice a thesis program now in effect will be continued. This program is directly connected with undergraduate research and is used as a tool for reviewing the literature. In addition to the thesis program, every teacher will assign supplementary reading through student journal clubs to provide wider sources of material and broadening the educational experience.

## *3. Staff and Staffing Patterns*

The Coordinators of Clinical Sciences, Biologic Sciences and Basic Dental Science will have the joint responsibility of organizing the unit content and supervising its presentation. However, the participating staff will be from every department as a conjoint effort to correlate all phases of the dental curriculum. Individual departmental supervision and guidance will provide the staffing pattern for research activities.

## *4. Relationship to Other Departments and Units*

Conjoint Sciences will be the unit which will require the greatest degree of cooperation from all disciplines within the Center. The unit will attempt to relate all phases of dental science and practice and provide an



integrated and correlated curriculum for student development. It is intended to be the strongest link in the correlation of biologic information with sound clinical practice. It is designed to convey to the student the relationships that exist between scientific knowledge, research activities and clinical problems. It is aimed at preparing the student to understand better the complexities of dentistry and prepare him to render comprehensive health care to his patients.

## E. COMMUNITY DENTISTRY

### 1. *Scope and Time*

The unit in Community Dentistry encompasses 272 hours for the 4-year curriculum supplemented by block assignments in community dental practice. Its basic objective is to develop in the dental student an awareness of his obligations to serve his community as well as his profession. The program will be structured so that this unit will (1) aid the student in an understanding of human behavior as it relates to oral health and disease; (2) develop in the student a realization of the importance of epidemiology and biostatistics in order that he may more fully appreciate the principles of dental public health at the local, state and national levels, and to extend these observations into a fuller understanding of dental research methodology and findings; (3) develop relationships with various community resources (Baltimore City and Maryland State Health Departments, the Board of Education, the Welfare agencies, organized dentistry, special dental care programs in public and private hospitals, etc.) for student participation in a community dental health clerkship; (4) utilize

the facilities of a special dental care clinic within the Dental Health Center for student participation in the treatment of physically and mentally handicapped patients; (5) seek out, identify and pursue research activities relating to community dentistry.

The first-year course content will be devoted to studies in epidemiology, biostatistics and an introduction to behavioral science. Epidemiology and biostatistics will deal with those skills and techniques whereby scientific methods measure, group, analyze and validate information upon which the dental profession has built its body of knowledge. The introduction to behavioral sciences will provide basic concepts as they relate to general health and disease among the various population strata. Professional self-appraisal will be emphasized by discussion of the role of the dentist in the health professions aggregate. Cultural and sub-cultural group reactions to dental health and practice procedures will be presented also in order to give strong emphasis to dentist-patient communication.

Behavioral sciences will be extended into the second year following the same basic course content with a shift in emphasis from group to individual behavior patterns as influenced by dental health and disease. At this time the student will be introduced to public health administration, its policies, its programs and its problems.

The third year will offer a continuation of the introductory course in behavioral sciences with emphasis on atypical patient attitudes and habits as they relate to oral disease and dental care. Deviations in human behavior related to both physical and mental



handicaps will be described and their implications to dental practice discussed. Communication between the dentist and patient will be stressed in the context that interview technics, etc., can provide valuable leads to the dentist in promoting better patient orientation toward definitive treatment procedures.

The third-year student will be exposed also to a special treatment facility within the Center where he will perform dental services for patients who exhibit a variety of handicapping conditions. This clinic will serve such patients as residents in local homes for the aging, the "brain-injured" child who does not require hospitalization, the mentally retarded, etc. The facility may serve also as a referral point for regularly admitted patients who are in need of dental care performed in a semi-isolated environment. Exposure to this program will be a prerequisite to rotation by the students through the various extramural special dental care programs in the fourth year. The extramural program available to students during the fourth year will include block assignments to various institutions such as the Children's Hospital of Baltimore, mental hospitals, etc. The anticipated result of these assignments will be an improved awareness of dentistry's responsibility to all segments of the population.

During the fourth year the student will receive a course in ethics and jurisprudence designed to help him understand his ethical, legal and moral responsibilities as a professional person in the community in which he will serve. A professional code of conduct

will be explored by student projection of what his own image of a dentist is, should be, and can be. Guest lectures by representatives of the State Board of Dental Examiners and organized dentistry will be included in order that students may direct their thinking to the importance and function of these segments of the profession. Dental public health problems will be presented to the students through cooperation and coordination with local and state health departments and field trips to public health facilities.

The course in behavioral science will continue through the fourth year in cooperation with the School of Social Work of the University. Block assignments of students to work closely with the social work staff at the Dental Health Center Admission Section will be initiated in order that the liaison between these two disciplines may be strengthened. Development of better triage methods through appropriate interview and other technics by a social work staff is highly indicated. Exposure to this activity should impress the senior dental student with the need for good patient counselling. This clinical setting also should provide an excellent source of material for field exercises for students in the School of Social Work as well as for patient-centered research problems relating to community dentistry.

The last topics to be considered under this unit will be dental economics and practice dynamics. Both the broad economic principles of health insurance programs, utilization of service, socioeconomic variables, manpower, as well as the specifics of individual private practice will be covered.



## 2. Methodology of Teaching

As in all other units, conventional teaching methods will be employed for the presentation of this unit. The lectures, seminars and conferences will be supplemented with intramural and extramural block assignments for student participation as observers and assistants.

The extramural program conducted at the various cooperating institutions will provide the environment for an awareness of the problems connected with the care of the physically handicapped, the aged, the mentally afflicted and other segments of the population not enjoying the so-called normal state within the community. The institutional staffs will conduct the teaching through close supervision of students, demonstrations and patient-centered seminars.

The intramural program will be conducted in the various specialty clinics and the community dentistry clinic within the School. Students will be assigned in small groups to assist and observe the treatment of nonconfined patients requiring special care. Faculty members will perform most of the procedures and demonstrate to the assigned students the complexities that exist. The special community dentistry clinic will be utilized for operative procedures rendered by students as well as the postgraduate facilities, with students observing the treatment of congenital and acquired maxillo-facial deformities, speech defects and other similar cases prevalent in a community but not suitable as patients for undergraduates.

For the teaching of dental economics and practice dynamics, emphasis will be given to the need for comprehen-

sive dental care based upon sound practice administration and economics. The importance of effective utilization of assisting personnel as well as the need for a dental health team effort will be emphasized. To accomplish these basic aims in the program (1) students will perform the clinical services with a dental assistant; (2) students will be assigned to a special clinic where full-time members of the faculty will render dental care to referred and/or special patients. Students will be afforded the opportunity to learn practice administration procedures as well as dental economics. Through exposure to these programs it is hoped that the student will be prepared better not only to utilize personnel effectively, but be oriented also to sound practice administration methods.

## 3. Staff and Staffing Patterns

Most of the experiences derived from this unit in the curriculum will be based upon close contact and association with qualified individuals. Since block assignments will be made to the special clinical facilities within the University as well as to the participating institutions, the staffing ratio of teacher to student will be a 1:1 or at most 1:2. Such ratios will afford an opportunity for tutorial teaching.

A Department of Community Dentistry has been instituted primarily to organize and direct the total program. Other departmental staffs will participate in a conjoint effort to inculcate in the student the awareness of community responsibilities. This unit of instruction will depend upon the dental faculty in general as well as other allied health professional personnel for the presentation of the program.



## F. ELECTIVES

### 1. *Scope and Time*

This unit in the curriculum involves approximately 70 hours during the fourth year; however, unscheduled time (140 hours per year) may be used by the student on his own volition as elective time. Enough flexibility exists within the various units of instruction to provide sufficient time for the pursuit of other academic endeavors. Proper utilization of this time will be helpful in broadening the educational background and stimulating the intellectual curiosity of dental students.

The electives program will be broad and flexible. It may include (1) academic experience in the liberal arts, (2) introduction to specialty training, (3) pursuit of advanced clinical experience, (4) advanced basic science training, and (5) research.

Broader training for dental students in liberal arts areas is highly desirable, but is rather impractical considering the geographical remoteness of the College Park campus and the small amount of elective time available. With the development of the Baltimore County campus of the University and with further expansion of the local University College program on the Baltimore campus, it will be possible for dental students to fit into these programs in an area of their choice. Students interested in teaching as a career may be able to take suitable courses in the College of Education. While most students will choose from electives offered within the School of Dentistry, there is no reason why students strongly desiring a specific course given by one of the other branches of the University could not be permitted

to register, providing the course is available at a suitable time and there is no conflict with other courses in the dental curriculum.

The electives program will also offer senior students an opportunity for familiarization with various areas of specialization in dental practice. A student might choose to spend his elective time to obtain training and experience beyond that normally available to the senior student in oral surgery, pedodontics, endodontics, periodontics, orthodontics or prosthodontics. Such training might provide experience helpful in making decisions with regard to specialization at a later date. A program of this type requires planning and coordination within the department concerned. A schedule will be arranged so that the students involved can receive well-programmed instruction in small groups.

Certain students with strong interests in the basic biologic sciences may wish to undertake additional course work in one of the basic science departments. Such a student might well register for a one-credit seminar or a special topics course during both semesters of the senior year or he might register for a two-credit graduate course for a single semester. Students interested in teaching and in graduate study after completion of the dental curriculum would find election of a basic science graduate course of special value.

Research training will be available largely through summer fellowships and part-time employment on grant-supported faculty research projects. Elective time might be utilized also for the purpose of training in research. It is unrealistic, however, to consider a



70-hour period adequate for the completion of any meaningful investigation. It is more likely that the students with previous research experience may use the elective time to continue an investigation already in progress, through utilization of unscheduled time in earlier years. Such problems would be carried out under guidance of a faculty member and authorization to use elective time for this research would be dependent upon adequate space, facilities and supervision.

While no definitive action has been taken by the Curriculum Committee, there is a feeling among the faculty that an honors program would be effective in challenging the student of clearly demonstrated ability. In most undergraduate honors programs students of high academic standing are allowed great flexibility in selecting a challenging program adapted to their particular interests and needs. The program will frequently include a number of courses at the graduate level. In considering an honors program for dental students, it is assumed that the students selected will meet all of the usual requirements for graduation and will pursue a program of additional study leading to levels of achievement and academic enrichment beyond that expected of the average student. The electives program might well be broadened for the honors program candidate so that he would have, particularly in the second semester, more time to carry out research, to develop additional clinical skills or to take advanced course work. Extension of the electives program in this fashion should effectively strengthen the honors program.

## *2. Methodology of Teaching, Staffing and Relationship With Other Departments and Units*

The program must be flexible in order to meet individual needs and interests of a heterogeneous group. Close supervision, guidance and counselling will encompass the methodology of implementing the program. Teacher to student ratio will be at least 1:1 and in all probability will be increased to 2:1 since several teachers will take part in individual student development. The program will afford the means for a student to receive great depth of instruction from several teachers in his chosen elective program. As a result of students' selectivity of the program desired, all departments within the Center and other schools and colleges within the University will participate in one or more activities under this unit of instruction.

While not necessarily an integral part of the Electives Unit, a career counselling service will form a valuable corollary to it. Essentially, this will be an area in which a student may seek information, advice and counsel on the many opportunities open in the dental profession today. This service would be available to all students but would be directed primarily toward the third-year class in order that early decisions could be made relative to internships, postgraduate and graduate programs.

## GRADUATE PROGRAMS

The graduate program in the Dental Health Center will be composed of several programs. First there is a program designed for graduate work leading to a Master of Science degree or



one leading to the Doctor of Philosophy degree in one of the basic sciences. These fields of study would include anatomy, biochemistry, microbiology, histology and embryology, pharmacology and pathology. The other type of graduate program would be more appropriately labeled postgraduate in nature since it would be designed for training in one of the clinical dental sciences with the awarding of a certificate of proficiency rather than a graduate degree upon satisfactory completion of the prescribed course.

A third type of graduate student is also envisioned. He would be one who has been accepted and enrolled in the Graduate School in one of the basic sciences, but, in addition, will continue to gain proficiency in a clinical phase of dentistry so that upon completion of training he will have earned the M.S. or Ph.D. degree in addition to a certificate of proficiency in an approved clinical program qualifying him for a specialty board certification. Still another type of graduate program is projected combining undergraduate dental education with graduate education. Upon graduation this student would have earned an M.S. or Ph.D. degree in a basic science discipline in addition to a D.D.S. degree. This part of our advanced education program may be patterned after the postsophomore traineeships now in existence.

In all areas of graduate education, the keystone must be flexibility and individuality of program design. Students in the various programs will be screened and selected carefully. Their courses of study will be tailored whenever possible to fit needs related to their interests and their goals for the future.

#### A. GRADUATE EDUCATION PROGRAM

The students who are pursuing a program leading to the M.S. or Ph.D. degrees will be enrolled in the Graduate School of the University of Maryland. Their acceptance to the graduate program and their continued participation will be dependent upon their satisfactory compliance with the rules governing graduate study in any department of the University. It is of utmost importance that within the Dental Health Center opportunity be afforded to those individuals who are interested in a career in dental education and/or dental research. It is advantageous, of course, to attract persons having achieved the D.D.S. degree, so that upon completion of their graduate study they will more likely continue in dentistry. However, since the School of Dentistry enjoys the privilege of having its own full-time basic science faculty, students matriculating without the dental degree are made aware more easily of the need for application of their graduate studies and research to dental health problems.

It is imperative that the graduate student be utilized for undergraduate instruction. His valuable assistance will aid immeasurably in the teaching program of the undergraduate dental student. He will be expected to assist in the preparation of lectures and help conduct laboratory exercises, demonstrations and quizzes. Graduate assistants may also act as supervisors for discussion of progress of students in a given area, evaluation and analysis of study habits and guidance and counselling. In effect then, they will be important additions to the faculty and are included in our projected staffing



pattern for teaching dental students. As faculty members, they will be housed with the appropriate department and will play a role in the development of dental student research programs and other department activities designed to enrich the undergraduate's experience.

It is of utmost importance that the research program engaged in by the graduate student be such that from it certain objectives will be satisfied. He is to utilize the methods of searching scientific literature to appraise critically scientific articles, to analyze and evaluate research methods toward the end of adapting them to his own needs, and, lastly, but most significantly, to organize and to pursue research projects leading to a thesis that will be successfully defended to qualify the candidate for the graduate degree. The graduate academic degrees both at the master and doctorate levels will be granted only by the Graduate School of the University and specifically in that department in which the student's major professor or director is located.

An estimated 45 clock hours per week will be spent at the University with approximately 3/5 time spent in research and 2/5 time attending formal courses or participating in undergraduate dental student teaching.

At the completion of training in the master and doctorate programs the trainee will have mastered the technics of that area in which he is enrolled as well as the use of related equipment. He will have learned the concepts of related subjects and will possess the ability to correlate basic information with clinical subjects.

By working in close cooperation and

direct association with experienced researchers and by doing research themselves, graduate students will become familiar with the tools of research and the methods of designing a project. They will attain proficiency in independent research and they will fully understand the importance and application of research to basic and clinical dental sciences in the undergraduate curriculum.

Individuals selected for graduate study will be those students who meet the entrance requirements of the Graduate School of the University and who show and express an interest in research and in teaching after graduation. Admission is contingent upon endorsement of the department head of the area in which the degree will be earned. Trainees accepted will be those holding either a baccalaureate degree, academic graduate degrees (M.S. or Ph.D.) or professional degrees (D.D.S., M.D., etc.).

#### B. POSTGRADUATE EDUCATION PROGRAM

A program designated as postgraduate education designed to train a candidate in one of the clinical dental specialties will be offered on a full-time residence basis. The duration of this program which is to be offered in endodontics, oral surgery, orthodontics, periodontics, prosthodontics, pedodontics, community dentistry, etc., will be of two or three calendar years, and upon satisfactory completion of course work will carry with it a certificate of proficiency. The course work and clinical experience gained will be designed to qualify the student for specialty board certification where applicable.



In contrast to the candidate for a graduate degree, the applicant for admission to postgraduate education will have earned a dental degree, and his record must be such as to indicate his ability to pursue advanced course work and clinical training.

The primary objective of the postgraduate clinical program will be to train clinicians of such proficiency that they may take their place in the dental community to function and serve as specialists in an appropriate field of dental practice. It is hoped, however, that in the education of these trainees a desire to teach at the clinical level will be engendered in them also. They will, by full- or part-time employment, help to staff dental schools, hospitals, and other service institutions where their specialty knowledge is so acutely needed.

The course program for the postgraduate student will adequately ground him in the basic sciences yet allow him sufficient time to master the technics of the specialty to which he has pledged himself. Graduate courses in the preclinical sciences such as pathology, biochemistry, physiology, microbiology, anatomy, developmental biology and pharmacology will be offered. Courses in basic dental science such as radiology, diagnosis, oral medicine as well as principles of medicine, endocrinology, dermatology, psychiatry, surgery and clinical pathology are to be part of the curriculum.

The postgraduate student will be allowed sufficient time for acquiring proficiency in the clinical aspect of his training program. He will learn essentially by the tutorial method so that, after an understanding of basic principles, he will perform at the chair

under careful supervision at first and later more independently.

In addition to training individuals for practice in the clinical specialties of dentistry, the program serves a most useful purpose in that those who are enrolled shall be used as clinical teaching assistants. It is felt that one of the greatest responsibilities of any type of graduate or postgraduate education is to inculcate in the student a desire to pass on knowledge gained to those who desire it. Thus, as the trainee gains proficiency in his clinical discipline, he will aid in undergraduate clinical instruction. He will be an integral part of the teaching team and will have responsibility for student instruction, evaluation and counselling under the aegis of the appropriate department head. He may be called upon to assist in laboratory sessions where applicable and where feasible present lectures on some specific subject in which he is especially knowledgeable. It is hoped that he may arrange in conjunction with faculty members of the department student seminars so as to increase the awareness of dental literature and how to evaluate it critically.

Although the aim of the postgraduate program is to train in one of the clinical specialties, it is hoped that if the interest is evident and time is available, the student might engage in a research project. The purpose would not be the results of the project *per se*, but rather the exercise involved in searching the literature, critically evaluating it and subsequently designing a well-conceived course of investigation. A plan such as this engenders a feeling for objectivity in reviewing literature, an appreciation of the efforts of



others and a greater understanding of how investigative action can be used to help correlate more basic principles with clinical disciplines. It removes research from the seclusion of the non-dentally oriented teacher and places it in the role of an active teaching instrument.

#### C. GRADUATE-POSTGRADUATE EDUCATION PROGRAM

The third type of graduate program is one that is described as a combination of the previously outlined programs. It will consist of a course of graduate study within the Graduate School of the University as well as a programmed course of study in a clinical discipline designed to qualify the trainee for certification by a specialty board.

The course content of this program will encompass both previously described programs but will not dilute either the basic science phase or clinical training. The time required for the completion of such a program will be a minimum of three calendar years for the Master of Science-clinical proficiency program-, and a minimum of five years of study for the Doctor of Philosophy-clinical proficiency program.

It is the desire of the faculty planners that a program such as briefly outlined above would attract men whose interests are in teaching in one of the clinical specialties, but whose basic science training would qualify them to engage in investigative problems on a very fundamental level. Their clinical training would allow for much carryover from basic research to clinical problems.

It is envisioned that the trainee will conduct a program of research in an aspect of a basic science which he can apply to his chosen clinical specialty. A program such as this can become a valuable tool in the overall teaching program in the Center. The undergraduate student becomes acutely aware of the importance of cooperation between the basic science departments and clinical practice. He sees in action the need for understanding by both segments the problems of the other and in turn learns to appreciate what each offers to his learning experience when viewed as a total structure rather than fragmented sections. Enormous benefit is gained by the two departments principally involved since there must be excellent cooperation in order to train effectively the graduate student in both phases of his program. Mutual respect for clinical dentistry and basic sciences is promoted and a truly integrated approach is developed.

#### CONTINUING EDUCATION PROGRAM

The basic objective of continuing education is to improve dental service to the public by improving the competence of the practitioner in both general and special areas of practice. At the same time it should provide opportunities for the dentist to develop his understanding and appreciation of the many facets of the arts and humanities which form such an important part of his dental education and which can contribute so significantly to his continuing professional development.

Teaching continuing education courses in the Dental Health Center



involves the use of all regularly used teaching aids such as visual aids, closed circuit television, lectures and demonstrations of clinical procedures. The methods of teaching employed will depend upon factors such as class size, facilities, personnel and the nature of the material being presented. The continuing education courses have been of one- or two-days and, occasionally, one night per week for a semester. Courses arranged in this manner have proven successful and interfere little with the dentist's practice. Future courses, however may be of longer duration and may be more intense. Courses on an intermittent basis have an advantage in allowing students to follow up results in clinical participation courses as periodontics. They have the disadvantage, however, of limiting attendance to dentists of the local area. The serial or progressive courses have the advantage of permitting teaching in greater depth. They also encourage continued attendance. If two or more weeks are to be used, it is generally preferable to have a one-week course with an interim of time before the second week.

Continuing education courses will not be limited to the clinical disciplines. Short courses in biologic and social sciences, community dentistry and other areas will be offered. A great number of these courses will be designed to review scientific data and basic information as a means of strengthening the practitioner's background in all phases of dental practice.

The refresher courses requiring clinical participation will have limited attendance in order to afford an ideal teacher-student ratio. A small clinic area will be available within the geo-

graphic confines of the Center to those study groups that may desire to avail themselves of this opportunity. It is well-known that throughout the country a large number of study groups are in operation, some of which require clinical participation. The experiences of these study groups are valuable aids in improving clinical skills and judgment as well as providing the means for self-appraisal and for self-improvement.

It is expected that study groups in occlusion, periodontics, prosthodontics, restorative dentistry and other areas will utilize this educational setting and, during the conduct of such activities (several days or weeks) undergraduate students will be invited as observers or assistants. The impact of being exposed to study group activity will impress upon the undergraduate student the importance of continually searching for improvements in his clinical understanding and knowledge. Encouragement of this concept will augment the need for constant self-education throughout a professional career.

## RESEARCH PROGRAM

One of the requisites of a vibrant curriculum is research which, collectively interpreted enhances all areas of inquiry constituting the educational milieu. The fertile fields of experimentation include those which are biologically, physically, clinically, educationally, psychologically and sociologically dominated. While the interdependence of these facets in an educational complex has been documented over many decades, only recently has it penetrated the health science curriculum.



Convinced of the need of multilateral research as an adjunct to the production of the finest product of dental education, dedicated efforts will be made to round out and improve our educational climate.

While basic research in its purest form has been historically held to be within the province of the pure academician, recently scientists of every discipline have begun to transgress this barrier. In the more progressive professional schools one finds programs of research unrestricted in scope, unfettered by administrative prejudices and unimpeded by fiscal restrictions. Thus, nourished in an atmosphere of academic freedom, basic research in this school has been and is being progressively developed to span an appreciable segment of the phylogenetic scale, to range from the molecular through the microscopic to the macroscopic and to embrace and amalgamate the diverse disciplines of the physical, social and biologic sciences. Strong and vigorous research programs avert stagnation of the participating instructional staff and thus will be reflected in the academic aspect of the curriculum so that the body of knowledge which is presented to the undergraduate dental student is current and of substance. Inclusion of material derived from on-going investigative programs has been found to complete or otherwise reinforce certain biologic concepts requisite to the full understanding of the structure, composition and function of the body. The efficacious results of research in effecting meaningful correlation between related preclinical and clinical disciplines have been demonstrated. This concept further stimulates in the

student the desire to search the literature, evaluate data critically and recognize areas where additional investigation is needed. Via the senior thesis, student research, postsophomore and graduate and postgraduate programs, the students are provided the opportunity to organize and execute research projects which are qualitatively and quantitatively of a caliber commensurate with their training.

If a research program in its totality may be categorically separated into broad divisions, one sees his efforts in this area in three aspects. First, there is basic or *fundamental research* which is seeking new knowledge at the cellular and subcellular level. Our present fundamental research activities include the following projects: cytokinesis of the sea lamprey egg to identify the stages of cleavage in the embryologic development of this species; the intermediary carbohydrate metabolism in a strain of *Staphylococcus*; electron microscopic observation of the decalcification mechanism of the oyster drill; odontoblast differentiation during dentinogenesis as studied with the electron microscope, a study of RNA ribosomes in protein biosynthesis; ion transport mechanisms and membrane permeability. In the area of *applied research* we have projects including the effect of tetracyclines on developing teeth in humans and animals; the relationship between anticonvulsant drugs and local anesthetic solutions using rats as the working model; a study of nutritional deficiency and endocrine imbalance as they relate to carcinogenesis in the oral mucosa; the role of kininlike substances in inflammatory diseases of the dental pulp; a study of antibiotic synthesis from



plants. Some of our *clinical investigations* include: a study of vertical facial dimensions of the edentulous patient using an electronic proximity sensor and indicator attached to denture base plates and recorded through a photosensitive device to a physiograph tracer; an evaluation and analysis of the rest position of the mandible in human subjects by electromyographic methods; a longitudinal study of the incidence of dental disease using panoramic radiographs; an evaluation of elastomeric impression materials used in reproducing intracoronal cavity preparations; studies on the transfer of *Staphylococcus aureus* between dentist and patient; correlation of DMF rates and the salivary secretor substance; an electron microscopic interpretation of dentin and enamel after cavity preparation using shadow casts and special methods of fixation; microbiologic interpretation of contents of periodontal sulci and pockets.

It should be evident that a broad range of research interests is being expressed by our faculty pursuing the more traditional avenues of biologic research. With a wide variety of interests, the likelihood of correlating research activities into our teaching program is excellent. At the same time, however, we will be responsive to the needs for programs of research. Such an effort is in its infancy now in the application of electron microscopy to a number of dentally oriented problems. Undoubtedly, the results of this program will become an integral part of our undergraduate teaching activities both in molecular biology and the science of dental materials, to mention but two possible ramifications. We are encouraging and will encourage inter-

disciplinary research projects and programs. The project listed above with respect to a microbiologic study of the periodontium is a cooperative effort between the Oral Medicine and Microbiology Departments. Similarly, there is a project in progress utilizing the research talents and facilities of the Departments of Physiology and Pathology in an investigation of ion transport mechanisms in normal and diseased oral mucosa. Undergraduate dental student research fellows have been and will be used widely in the conduct of most of the research activities.

An up-to-date program of dental education can no longer confine its research interests to investigations in the fields of biology and physics; rather it is now ones responsibility to widen his investigative programs to include sociologic, economic and educational fields as they may relate to dental practice and dental education. It is hoped that the sociologic aspects of the curriculum embody all activities which are cogent to the development of social consciousness. An educational atmosphere replete with socially directed components should provide a variety of experiences in which the student will have developed the potential to establish satisfying rapport with others. He should become sensitive to relations, skills and prospectives essential for responsible citizenship, develop fundamental moral and ethical standards, and be imbued with tolerance, understanding and respect for the diverse cultures which constitute the American Society. To weave these concepts into our program of dental education will require the development of research interests in the prevention



and control of oral diseases in the community setting, in the behavioral sciences with reference to individual and group reaction to dental disease, in the functions of dental auxiliaries with respect to their responsibilities to the profession, in communication especially in regard to dental health education, in dental equipment design and function, in practice management and the economics of dental practice, in attitude inventories of dentists, etc. In a program of dentally oriented sociologic research we have excellent potential to establish multi-disciplinary projects bringing in persons outside of dentistry from the Schools of Medicine, Law and Social Work, the College of Education and the Psychiatric Institute.

In addition to biologic, physical and sociologic investigations, it is necessary that one fosters studies of dental education itself. One must continually alter, adapt and innovate methodological procedures which effect improvement in our instruction of dental students.

While the total undergraduate curriculum will be essentially one of correlative and integrated learning experiences, one has the obligation to scrutinize it continuously for flaws, inherent or developmental. To do this adequately one must have a working knowledge of the psychological principles governing meaningful learning. Broadly envisioned, learning must embody the acquisition of those concepts and principles, skills, abilities, attitudes, ideals and knowledge that are requisite to the student in his adaptation to his environment, present and future. While psychological research has not yet resolved the question of

when learning is or is not stimulated, experimentation has established that learning can be facilitated, once it has been initiated, when conditions such as readiness, need, interest and subjectiveness are in operation. Learning in its more restricted sense is defined as an alteration in performance effected via practice. Practice in the material to be learned may be accomplished by repetition either in entirety or in part. While each method has its advantages and limitations, most educators agree that progress through a learning experience is executed more efficaciously by a modification of the whole method, in which particular emphasis is placed and greater repetition is made of the more difficult or important areas. Students of educational psychology maintain that frequency of situations and responses, when properly administered and controlled, enhances learning. They also hold that with stabilization of related factors, recurrence of the reinforcing circumstances facilitate learning. The psychologists who specialize in human learning are in absolute accord with the principle that retention, which is measured in terms of recognition, reconstruction, recall, relearning, resistance to extinction, etc., is enhanced by the association method. In formulating curriculum components, the teaching personnel must be cognizant of the accepted educational and psychological dicta.

An appraisal of learning experiences achieved via the multidisciplinary approach must not be in terms of the students alone, but must also include instructors, staff organization and administration. Accordingly, judications must follow such as the extent to which the multidisciplinary approach



improves the curriculum, the quality of instruction, the competency of teachers, and the efficient utilization of other constituents of the University's organization such as staff personnel, resources and the like.

In assaying the utility of instructional needs, alterations in maturity of personality, scope of student adjustment and accomplishment, adaptability of personnel organization, student-faculty cooperation and communication and growth, a variety of evaluative technics must be employed which will indicate strengths, weaknesses, problems and areas requiring further experimentation, in terms of the educational objectives proposed. To this end it is our desire to bring to the faculty a person trained in the theory of education. The presence of this individual as a dental faculty member will serve several purposes. He will advise and encourage curriculum improvement and development, assist the faculty in tests and measurements and act in a liaison capacity between the College of Education and the Dental Health Center.

With regard to administrative patterns in the research program, a strong broadly based series of investigations in all areas of the Center will depend upon an equally strong departmental structure. This observation is based on the fact that where strong research programs exist, a climate has been developed for a group of academicians to gather. The maintenance of departmental identification should provide present and future faculty members with the opportunity to express themselves in their own individual areas of interest. To complement the departments in their experimental

activities other University components will provide the necessary corollary assistance such as fiscal management of grants and contracts, aid in procurement of technical personnel, computer services, etc.—the objective being to free the investigator from these more mundane but necessary duties that are a part of every research program.

## DENTAL AUXILIARY PROGRAMS

### A. DENTAL HYGIENIST PROGRAM

A program for the education and training of dental hygienists within the prescribed framework of the Dental Health Center is to be instituted. The program will have as its aim not only the training of personnel to carry out the functions prescribed for hygienists, but, more important, to teach the dental student to avail himself of their services. The hygienist's responsibilities will serve the needs of dental education and good dental health primarily in the areas of preventive dentistry. The outlined program is designed to educate and impress on the student a philosophy of preventive dental care that will complement and support the philosophy of integrated departmental teaching proposed for the undergraduate dental curriculum. By imbuing the trainee in the concepts of preventive dentistry we will supply the practicing dentist with personnel adequately trained to meet the needs of today's dentistry. The hygienist must be made to recognize the importance of prevention of further dental disease by therapeutic procedures of debridement and prophylaxis. Of equal importance, however, is the need to recognize that by patient education and teaching of good oral hygiene the hy-



gienist is contributing to even greater dental health.

The program is designed to graduate a professionally as well as socially conscious individual capable of assuming an important place in the dental health team and the dental community. The students will be technically trained and mentally alerted to their responsibility in achieving this goal.

The educational experience for dental hygienists will consist of a two-year program for certification. The program would be designed to allow the student, upon completion of the two years of training in the Dental Health Center, to take advantage of two opportunities: (1) to secure employment as a certified hygienist either in private practice or in an institution, and (2) to continue in an academic program designed to prepare the individual for a career in education (an excellent source of faculty for schools of dental hygiene and assisting), in public health programs, or in other areas which may require training beyond the two-year program within the Center.

The projected entering class size would number forty-eight (48) students. It is felt that this number would be adequate based on the projected needs of the dentists within the State of Maryland. Since a new class will be entering each September, it will mean that approximately 96 student hygienists will be in attendance each year.

Students who have met the entrance requirements will be admitted directly from high school based on a satisfactory preparatory program and proper recommendations.

## 1. Social Sciences

It is imperative that the hygienists have a basic knowledge of the physical and biologic sciences necessary to understand the more advanced basic sciences and their relationship to dental hygiene practice. Since the trainees will be expected to function in a setting of close personal contact, they should be versed in the social sciences as well.

*English.* This course will be designed as a grammar and composition course elaborating on those given to high school students. It will be at the college level with a goal of providing adequate exposure to technics of composition and expression through the media of the written and spoken words.

*Sociology.* A basic course in sociologic concepts as they relate to the interaction between individuals in our modern society will be offered.

*Psychology.* It is important that the hygienists have a comprehensive course of instruction in psychology. They will be dealing daily with individuals of varying temperaments and backgrounds. They must have an understanding of human behavior in order to handle the emotional needs of the patient which pertain to the services rendered by them in the dental office.

## 2. General Sciences

*General Chemistry.* A survey course in general chemistry will serve to ground the student in chemical concepts as well as specific knowledge necessary to understand some of the biologic and chemical reactions of the body. Knowledge of this area will help the hygienist to realize more fully the



actions of fluorides and other chemical substances constantly in use in a dental practice. It will also serve as a preparatory course to basic organic chemistry and pharmacy.

*Organic Chemistry and Pharmacy.* This course is designed to present to the students the chemistry of drugs and their reactions as they pertain to the human body. It covers the various types of organic compounds and relates these to chemical action within the basic framework of pharmaceutical chemistry.

### 3. Basic Biologic Sciences

*Anatomy.* A basic course in macroscopic and microscopic anatomy will be offered to acquaint the students with the necessary knowledge appropriate to the extent of treatment they will render. A program of gross anatomy will be offered to cover thoroughly the head and neck and contiguous structures involved. This will be accomplished through demonstrations and lectures. Microscopic anatomy will be a general course covering the basic histologic appearances of various tissues. It will be concerned primarily with those areas that are covered by the gross anatomy course and will be taught concomitantly so as to have the two facets of the course complement each other. Basic neuroanatomy will be presented also.

*Physiology.* A course in physiology designed to acquaint the students with a review of systems and their importance in total body reactions will be offered. Included will be a more concentrated presentation of muscle physiology, physiology of mastication and deglutition, physiology of salivary

glands and saliva as well as calculus formation.

*Oral Pathology and Microbiology.* A course designed to make general patterns of disease more understandable will be presented to the students. However, the course will be basically oral pathology and will concern itself with oral manifestations of general pathology and specific oral pathologic problems. It will be composed of lectures, demonstrations and some microscopic projections to reveal to the students the deviations from health which they are called on to treat.

A course surveying the importance of general microbiology as it applies to the human will be offered. The students will learn of the various groups of bacteria and their properties. Stress will be laid upon the importance of bacteria in the oral cavity and the role they play in dental caries and periodontal disease.

### 4. Basic Dental Sciences

*Dental Anatomy.* It will be the objective of this course to acquaint the students by lecture and demonstration with the form, function and composition of the component parts of the oral cavity, primarily the dental apparatus.

*Dental Materials.* Students will gain through this course an understanding of the physical and chemical properties of the materials commonly used in the dental office. They will learn by a laboratory course to handle and become efficient in the manipulation and application of dental materials. They will be expected to learn and understand the principles of operative dentistry; i.e., cavity preparation based on types of carious lesions, types of restorative



materials and their indications and the general importance of high quality restorative dentistry.

## 5. Clinical Dentistry

*Preventive Dentistry.* A very thorough course in the fundamentals of preventive dentistry and epidemiology will be offered. In it the students will learn and understand the importance of preventive dental care and its application. Fundamentals of epidemiology and basic statistics will be presented. Incidence and geographic distribution of dental disease and their social impact will be stressed. Indoctrination in methods of patient education, patient psychology and patient cooperation with preventive measures will be offered. The importance of fluorides to the individual and the community in caries control will be stressed. Periodontics as an epidemiologic entity will be covered as well as means of prevention of this disease. Of significant importance will be the inculcation of the trainees with respect to the role they will play in the prevention of dental disease as members of the dental health team. Another aspect of the course will be instruction of the students in clinical procedures associated with preventive dentistry other than the prophylaxis *per se*. They will learn by chairside demonstration and then individual participation to instruct properly in home oral physiotherapy using disclosing wafers and brush. They will learn the proper application of topical fluoride solutions as well as stannous fluoride prophylaxis pastes. The course will stress the importance of the dental hygienist as a valuable member of a team dedicated to prevention of dental

disease and preservation of the natural dentition.

*Dental Prophylaxis Technics.* This course will offer lectures to familiarize the students with the instruments to be used in the prophylaxis procedures as well as other knowledge necessary to carry out clinical duties. They will learn the technics of unit preparation for the patient, the manner of approaching the patient and the technics of instrumentation. After thorough grounding in these rudiments are completed, the students will be assigned to the clinic for learning experience with patients. In addition to clinical experience in prophylaxis and patient education, the hygienists will, at various appointed times, assist the dental student so that they may become even more aware of their complementary role to the dentist by familiarizing themselves with the scope of dental practice. They will gain insight into the importance of training not as an end in itself, but as an integral part in the preservation of oral health.

*Dental Radiology.* By a series of lectures and demonstrations the students will learn the principles involved in the production of X-rays as well as the properties, effects and hazards of dental radiography both to the operator and the patient. They will learn, in addition, the technics for exposing and developing these films, and interpretation of results where routine anatomic structures are involved.

*Pedodontics.* The importance of dentistry for children and the early introduction of the child to dentistry will be stressed. Preventive measures as applied to pedodontic care will be pre-



sented as well as the need for early dental therapy so as to preclude the ravages of advanced dental disease as a result of neglect. The need for space maintainers,  $\text{SnF}_2$  applications and interceptive orthodontics will be stressed.

*Orthodontics.* An introductory course in principles of orthodontics, goals and objectives will be offered. Malocclusions, their effect and treatment as they pertain to preservation of the dentition will be a significant part of the program.

*Periodontics.* A thorough review of the etiology, classification and treatment of periodontal diseases will be offered. Periodontal disease of the younger patient and its prevention will be thoroughly considered. The preventive measures to be taken by both the dentist and the hygienist are to be stressed. Effective oral hygiene and its relationship to oral health will be demonstrated clearly, since the hygienist will see patients who have completed periodontal therapy and who are on periodic maintenance recalls.

*Community Dentistry and Public Health.* The students will have the opportunity to work within a dental public health setting. They will attend lectures designed to acquaint them with the obligation of the dentist and the hygienist to the community as a whole. They will understand the importance of dental care for nonambulatory patients and how rendering this service can be a valuable adjunct to total health. The hygienists will be made aware of the great demand for dental services and how they may help to answer these needs by practicing preventive dental procedures, thus de-

creasing the demand for therapeutic dentistry.

## 6. Miscellaneous

*Public Speaking.* A course designed to acquaint the trainees with the fundamentals of speech, diction and interpersonal communication will be offered. Its aim will be to train the hygienists so that they may effectively convey to both the patient and larger groups the importance of the dental services to which they have devoted themselves. The hygienists will be spokesmen for dentistry, and it is important that they be understood.

*History, Ethics, Jurisprudence and Office Management.* This course is designed to instill in the students an appreciation for the heritage as well as the professional obligation of dentistry. It will demonstrate to them a professional air which will demand adherence to the highest moral and legal obligations of a member of the dental health team. In addition, they will be exposed to the principles of office management, bookkeeping and such other matters as are normally accounted for in the daily operation of a dental office.

*Teaching Methodology.* Teaching within the dental hygiene program will consist primarily of didactic sessions complemented by demonstrations where applicable. Laboratory courses such as may be necessary in dental materials and anatomy, histology, pathology, human anatomy and the like will be offered. Clinical experience necessary for the learning of prophylaxis technics and preventive dentistry measures will be carried out on patients in the preventive dentistry clinic. Experience in dental assisting will be



gained in the undergraduate and graduate clinic areas where preceptor-type teaching will be most advantageous. In addition, the student hygienists will rotate through the Western District Health Center of the City of Baltimore where they will have the opportunity of observing the function of the hygienist in a public health setting.

The courses of instruction will be under the supervision of the departments of the School of Dentistry in which training is to be given and the Division of Dental Auxiliaries. Those courses that are primarily basic in nature will be supervised by a representative of the department concerned who will have direct charge over course content, presentation and evaluation. The same will apply for clinical courses at the laboratory level. Once the student is in the clinical setting, however, supervision of instruction will be placed in the hands of a staff of graduate dental hygienists responsible for instruction. It will be their responsibility along with other faculty involved in clinical practice to teach and evaluate at the chair those procedures which the student is carrying out on patients. It is anticipated that a minimum of four to five graduate dental hygienists will be employed to assist in the clinical as well as the didactic phases of the program where instruction by them is indicated.

Those courses which are not purely dental in scope, such as the social sciences, general chemistry, organic chemistry and such, will be presented by members of the University College faculty on the Baltimore Campus. A director of the Division of Dental Auxiliaries will be appointed. It will be the responsibility of this individual to cor-

relate and direct the various activities of the division in an efficient manner in order to utilize best the teaching personnel available for instruction. The director will be responsible to the Dean of the School of Dentistry in all matters concerned with the program of the Division of Dental Auxiliaries.

It is significant that the development of a dental hygiene program at the University of Maryland will be designed to complement the education of dentists. The philosophy of the Dental Health Center is based on the premise that the utilization of auxiliary personnel can best help to secure for the population an added means for preventing dental disease and in maintaining dental health. Our students will understand that the procedures which they are carrying out are those designed to prevent as much as possible the occurrence, recurrence and progression of oral disease. It is projected that all patients admitted to the dental clinics at the University will, before a final treatment plan is conceived, be seen by student hygienists. It will be their responsibility to perform prophylaxes using  $\text{SnF}_2$  paste, topically apply fluoride solutions and instruct in the principles of good oral hygiene. Thus the trainees immediately recognize their position of importance in the creation and maintenance of good oral health. Only after thorough indoctrination in personal preventive dental measures does the patient advance to other clinics for remedial therapy. Upon receiving the patient it then becomes the responsibility of the dental student to continue the dental health education program so that by his reinforcement of the work of the hygienist a true program of preventive dentistry can be accom-



plished. It will be mandatory that an oral hygiene index for each patient seen in the preventive dentistry clinic be recorded. It will serve as a base line for future reference, since it is anticipated that patients who have completed their dental treatment will be returned to this clinic for periodic maintenance visits. A new oral hygiene index will be recorded and compared with the one taken at the initial visit. This will provide the means for constant evaluation of our program of preventive dentistry.

### B. DENTAL ASSISTANT PROGRAM

The need for well-trained dental assistants has increased manifold during the past few years. Students have indicated the increased efficiency in operation of a dental office where assistants are employed. Since the nation's dental schools cannot graduate enough dentists to meet the demand for services, it is apparent that the profession must increase the efficiency and productivity of the dentists being educated. Trained dental assistants help significantly toward reaching this goal. Since it is anticipated that an activity to train dental assistants will be developed, it is logical to complete the formation of a Dental Health Center through offering formal training for assistants within the University.

The establishment of a dental assisting program serves two very important purposes. One, it allows dental students the opportunity to work with an assistant and to instruct them in the efficacious use of ancillary personnel; and, secondly, it trains assistants to be effectively employed in dental offices. The combination of training of

dental assistants *per se* and their adjunctive help by working with dental students satisfies a training need for both groups concerned. It can reasonably be anticipated that if the student, during his undergraduate instruction, learns to utilize an assistant, he will seek one for his practice, thus substantially increasing his productive capacity.

The proposed course of study will run for one calendar year and will consist of an entering class of 32 students every 6 months. Certain high school courses will be required prior to matriculation. Because of the limitation of time to one calendar year, nontechnical as well as those courses not related to the social sciences will be prerequisites for entrance. Specifically they would include typing and bookkeeping in addition to the other required courses necessary for graduation from high school.

The acceptance of an entering class of 32 students twice a year has certain advantages related to the undergraduate dental student program. For the initial 6 months the trainees will be thoroughly educated in the didactic courses outlined below as well as familiarized with their duties as a dental assistant to the undergraduate student. They may then for the last 6 months of training serve ably as more experienced dental assistants by devoting practically all of their time to this function. The education as an auxiliary to the teaching program will therefore be valuable not only to the student as a qualified assistant, but it will also increase the efficiency of patient care by the dental student.

Courses designed to generally acquaint the student with the scope of



dentistry and its impact on our society are necessary. In addition, introduction to some of the basic sciences and behavioral sciences is indicated. English, zoology and speech will be a part of the didactic program also. A general outline for the program would be as follows:

### 1. General Sciences

A continuation course from that completed in high school would concentrate on English grammar, composition and exposition of the written word. In addition, courses in speech and diction will be presented so as to prepare the student for public contact. Since the assistant will be in close contact with the patient as well as conversing with doctors, it behooves the program to train young persons who may acquaint themselves well with day-to-day contacts in the dental office. A general science survey course which will cover the very basic rudiments of chemistry, physiology, anatomy and microbiology will be offered. This will serve to broaden the appreciation of the student for functions involved in the human body and will especially highlight their application to dental health and disease. A basic course in general psychology and sociology will be offered which will be on the college freshman level. Sociologic principles of group functions, human behavior and social motivation will be discussed. Psychological deviations and reactions will also be evaluated, especially as they relate to the dentist, dental care and the general population.

### 2. Basic Dental Science

A course designed to inform and teach the student the purpose and

function of the various aspects of clinical dental practice will be offered. It will be presented as an integrated program to convey to the assistant the importance of all phases of clinical dentistry and the need for interdepartmental cooperation in the ultimate aim of total dental health care. There will be emphasis at this point on the importance of preventive dentistry as it relates to each department and the manner in which it is practiced both by the dentist and the patient. An introduction to dental materials, their properties and manipulation will be offered. An exposure to the instruments commonly used in the general practice of dentistry will be provided and all other things necessary to prepare the students for their part on the dental health team will be carried out.

### 3. Dental Assisting

A didactic course in the fundamentals of dental assisting will be offered. Initially it will consist of lectures and demonstrations to convey to the student the necessary procedures to be followed to assist the dentist effectively during his routine patient treatment. After completion of the didactic phase, the dental assistant students will be assigned to work with the senior dental students to gain practical experience at the chair. Initially, supervision will be provided by the staff of the Division of Dental Auxiliaries, but it is anticipated that after a short period of time supervision will not be required over and above that which is offered by the dental student. Dental assistant students will also be rotated through both general practice and specialty clinics to familiarize them with all aspects of dental practice.



The method of teaching will be as outlined above. Material will be presented in lectures and demonstrations by members of the faculty of the Division of Dental Auxiliaries, the School of Dentistry and the University College of the University of Maryland. Nondental subjects are offered in the University College at the present time and will pose no major problem in scheduling for the students.

The program for dental assistants will be under the purview of the Division of Dental Auxiliaries whose director will also have responsibility for the training of dental assistants. It is anticipated that a number of certified dental assistants will be available for instructional purposes within the Division in both the clinics and the laboratories, this number to be supplemented by part-time staff members as well as the staff dental hygienists when practicable.

#### FACULTY PRACTICE PROGRAM

Instruction in the art and science of dentistry is dependent upon the ability of teachers to convey to the student the concepts and practice of executing a variety of clinical procedures, thus making it imperative that those individuals charged with this responsibility be proficient in their respective fields. In order to teach effectively, it is necessary that the teacher be familiar with the therioetical aspects and be able to perform clinical procedures with knowledge and skills derived from actual experience.

The faculty practice program is a means of providing an opportunity for the participant to engage in a practice in which he will utilize his therioetical

knowledge in a practical manner. It enables the teacher to present material to students based on practical experience. The contact with patients that the staff member has while engaged in clinical instruction is only a cursory one at best; consequently, he cannot exhibit to the student that "this is the way we do it" unless he actually does it. Faculty intramural practice provides this opportunity for professional self-improvement even though it will be on a limited basis insofar as time spent is concerned.

The rapidly advancing body of knowledge in dentistry today requires that a man, to be an effective teacher, must be constantly aware of changes in technics, dental materials and equipment. The practice program provides a means for the teacher to put to practical use these advances and to use them as actual teaching instruments. It will be utilized on the postgraduate and undergraduate levels and will provide training opportunities in the area of dental auxiliary education.

The undergraduate student, by seeing the teacher practicing his specialty, gains greater knowledge of the scope of that field. He observes its practical application in its entirety and in turn gathers a greater appreciation for what it can do toward total oral health. He observes and recognizes how important one phase of dental care is and how it affects and is affected by other branches of dentistry.

For the postgraduate student, the intramural practice provides a means of even greater preceptor type instruction. In addition to treating his own patients, the postgraduate student learns by observing how certain advanced procedures are performed in



a manner consistent with the needs of the patient.

The student dental hygienist and student dental assistant are afforded the opportunity to learn under the ideal situation of practice. They have an understanding of how dental practice is conducted and can, through the knowledge learned with the dentist, further aid in the training of dental students to utilize their services effectively.

A further application of the faculty practice plan in the overall teaching program of the Center will be that, in a very positive way, it will provide a means for teaching the dental student the mechanics of operating a dental practice. He will see the value of sound practice management and dental economics.

Still another advantage is seen with respect to the concern which has been shown today in the field of redesigning dental equipment and reorganizing its place in the dental treatment room. This clinic may provide an excellent means for evaluating new equipment as it would be used in the private practice of dentistry. The faculty practice program, therefore, becomes a means of investigation into office design and equipment requirements for the practice of the future.

The full-time teacher deserves a respected place not only within the University but also within the community as a whole. He is to be regarded as a dedicated person whose primary goal is to instruct. It is imperative, however, that his knowledge of dentistry, especially that particular specialty which he practices, be recognized generally. The faculty practice program will provide the means of recognition

of dedicated men in that they may have referred to them the difficult, the unusual, the most challenging problems by dentists in the area. In this way, the Dental Health Center can assume a place not only for instruction in the science of dentistry, but a place where one may confidently refer to competent people vexing cases which might otherwise go untreated.

\* \* \* \*

In the foregoing pages an attempt has been made to describe the philosophy and concepts, organization, operation and integration of a new dimension in dental education—the University Dental Health Center. While some of the programs may be viewed as a departure from the traditional, the basic principles underlying instruction in dentistry have been maintained and, we believe, strengthened. The keystone supporting an arch comprised of components representing the dental health team is *integration*—integration of activities of dental health personnel who have not previously been educated together; integration of the learning experience within each program; and, most important, integration directed at the delivery of oral health services to the society we serve.

Dentistry as a health service has demonstrated a variety of achievements since its birth as a profession in 1840. Not the least of these have been technical excellence and increased biologic orientation. In the latter half of the twentieth century the profession has begun to respond to a call for increased social awareness. As a university discipline dental education must meet and surpass its previous accomplishments in the continuing evo-



lution of dental science. Also, as a part of a modern university, the Dental Health Center must keep its programs focused on the dual aim of the academic community — the promotion of learning and public responsibility. The process of education, whether it be in dentistry, engineering, law, medicine, business administration or theology, is

a dynamic and changing force which often presents a paradoxical profile. While it must remain anchored firmly to time-tested principles, it must also continually extend itself to uncover hidden truths within these same principles and thereby contribute to man's progress toward better understanding and control of his environment.

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In a forthcoming issue of the Journal of the Baltimore College of Dental Surgery will appear a description of the physical facilities proposed to house the University of Maryland Dental Health Center.



























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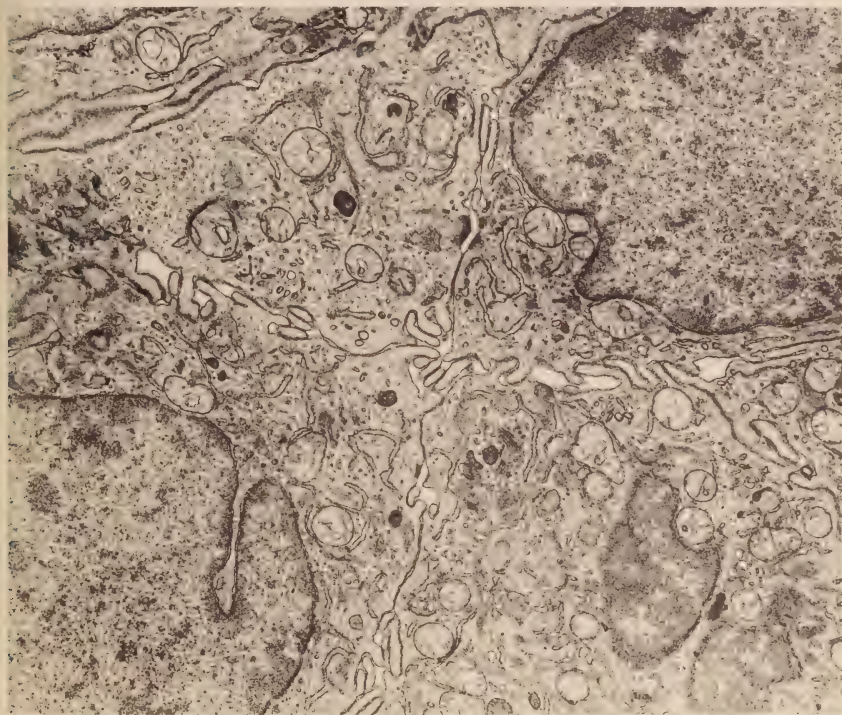
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Electron Micrograph of Human Outer Enamel Epithelial Cells

*Cover:* Electron micrograph of human outer enamel epithelial cells.



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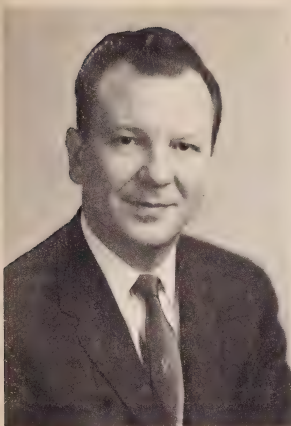
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## Dental Practice In The World Of Tomorrow

The pleasure I have in being with you today is tinged with astonishment that seventeen years have raced by since I sat as a graduate on the other side of the rostrum. As alumni of the oldest dental college in the world, we are heirs of a unique tradition in dental education, and our heritage calls upon us to rise to our highest capabilities.

Seventeen years ago, Americans still had mixed feelings about the problems left by World War II and the uncertainties of the peace. Commercial television was in its infancy; airplanes with two piston engines were the backbone of air travel; high speed dental equipment was still on the drawing board. Root canal treatment of poster-

ior teeth was not advised; a doctrine prevailed that oral implants would never work because they were foreign bodies; and very few dentists knew how to use effectively a chairside dental assistant.

The enormous advances in dental science and technology over a short period of time have had a dramatic impact on dental practice of yesterday and today. These improvements have been widely heralded, and I need not mention them here. Even more important than scientific advance, however, are the dramatic changes that have taken place in social philosophy and in public attitudes toward health care. These are the changes that will have the greatest impact on the dental practice of tomorrow. The public is becoming dissatisfied with health practices which lag behind the capabilities of the professions.

As evidence of the public's interest, private expenditures are increasing

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Address presented by Viron L. Diefenbach, D.D.S., M.P.H. Assistant Surgeon General, Chief, Division of Dental Health, U.S. Public Health Service, Washington, D.C. at the Honors Convocation of the University of Maryland College of Dentistry, Baltimore, Maryland, June 3, 1966.



steadily for health care through health insurance and through direct payments for health costs. At the same time, public expenditures have reached new highs for health research, for the construction of hospitals, for the building of medical, dental and nursing schools, for the establishment of scientific libraries and for the expansion of health research laboratories.

The public has invested in dentistry and medicine to an unparalleled extent. Millions of tax dollars are supporting dental school construction. Most dental schools are built on public land. The public bears the major share of dental education costs, since the tuition and fees paid by students cover only one-third of the actual expenses.

The research which has added new technology to modern dental practice has been supported in large measure by public funds. Thus, to an unprecedented degree, the education of dentists and the development of dental science have been underwritten by the public. Now the public is interested in dividends from its investments.

The emerging demand of the American people for more and better health service is evident in other ways. The thirty-year struggle for Medicare has resulted in new legislation of far reaching import. Whatever an individual may think of the merits of the program, there is no doubt that the great majority of the people of the United States wanted Medicare.

Another law which may have an even greater effect on the practice of medicine and dentistry is the heart disease, cancer and stroke program. In addition, recent Congressional actions have increased support for community health programs, for mental

health centers, for health care to deprived children of preschool age, and other health services too numerous to list here. Only starry-eyed visionaries would have predicted six or seven years ago that all of these programs would be in effect in 1966.

What does all this mean to you? It means that you, together with all the other members of the health professions, are being pressed by social progress to deliver at your full capacity. Its means that, on the whole, people are better educated, are more prosperous and have higher expectations for health than formerly. The public is saying that the quality of life is as important as its length, and health is an essential ingredient of both.

It means that people want comprehensive health services for as long as they need them, when and where they need them, and at a price they can afford to pay. It means that dentists must understand, accept and act upon the principle that every citizen should have the opportunity for good health to the limits of dentistry's capacity to provide it.

It means that the dental profession is facing new problems the solutions of which we now are seeking and which you can help us find. And finally, it means that, in spite of your hard work and all that you have learned, you must face the fact that because of advances in dental science yesterday, the obsolescence of the new graduate begins today.

Organized dentistry must now ask itself how far it is prepared to plan its responsible role as a health profession. Social progress is certain to produce changes in the practice of dentistry, in dental education, and in the organiza-



tion, delivery and payment for dental care. Although the evolution of these changes will be fascinating to observe, we must not watch these changes as bystanders, either in admiration or reproach. To a large extent, the role the profession will play will be determined by dentists themselves—by *you* as you move into the mainstream of professional life.

The day has gone when the dental graduate can plunge into private practice with little regard for the community and the profession of which he is a part. He can no longer wrap himself cocoonlike in the private domain of his office — completely autonomous, self-regulating and self-centered. Those of you who immerse yourselves in your offices, unresponsive to—or worse, unaware of—social progress, will dry rot.

Our distinguished colleague, Dr. Philip Blackerby, of the Kellogg Foundation, has said that he shares the widely held opinion that “dentists generally are relatively lacking in social consciousness and that this attitude may be traced directly to a weakness in their professional education and to the professional isolation that characterizes the dental practitioner.” I, too, believe that change must come both in education and in attitude. With this change, community responsibility will be built into the dental curriculum and professional isolationism will eventually vanish.

It behooves those responsible for dental education, those who lead organized dentistry, and every dental graduate to remember that the public has granted to the profession the privilege of dental practice, and that this privilege will be continued only as long as it serves the common good.

I believe firmly that what best serves the public good in health affairs is also best for the profession. The obligation of dentists to work for the common good has always existed. The new element to which we must respond with fresh awareness is the fact that those we serve expect more of us than we have given in the past. If we match the high public expectation with equally high performance, I am confident that the rewards to the dental profession will rise proportionately.

In a democratic society, there must be ways of accommodating different points of view and different ways of doing things. Tolerance enables a free society to work. In the development of better dental care for more people, new methods and reasonable alternatives must be tested. There is no place for professional rigidity. New programs must be hammered out after acceptable solutions have been agreed upon. I am confident that the same critical spirit that is producing remarkable advances in the health sciences can produce the best health care for the greatest number of people.

From this date forward, *you* are the dental profession. I envy you your youth, your fresh insights, your growing sense of responsibility, and your eagerness to take your place in the dental profession. Never before have we had such an abundance of opportunity, such multiplicity of new challenges and such promise of rich rewards. In your community and in your profession, don't wait to be asked. Invite yourself in and get to work. Make things happen!

I hope satisfaction and happiness lie ahead for each of you. I wish you well.



# Ultrastructural Characteristics Of The Human Enamel Organ In An Early Stage Of Development

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**SUMMARY**—The fibroblasts of the dental sac were arranged in layers intervened by collagenous fibrils. The cellular and formed intercellular elements were closely packed with the longitudinal axis of the former directed parallel to the outer surface of the enamel organ. Pronounced differences in the cells of the four-layered enamel organ did not exist except for morphologic variations and certain cytologic features. The shape of the cells varied from cuboidal to stellate in the outer enamel epithelium, stellate to dendriform in the stellate reticulum, squamous in the stratum inter-

medium and low columnar to columnar in the inner enamel epithelium. Except for the tonofilaments significant differences in the variety or quantitative aspects of the organelles did not occur. The three types of junctional complexes were observed in the enamel organ. These were more numerous in the outer enamel epithelium. A glycocalyx was found on the surface of the enamel organ components and dental sac fibroblasts. This surface envelope was especially well developed in the stellate reticulum.

## INTRODUCTION

The ultrastructural features of the various cell strata participating in the developmental history of teeth have been studied extensively during the past decade (Watson and Avery, 1954; Nylen and Scott, 1958; Nylen and Scott, 1960; Scott and Nylen, 1960; Reith, 1961, 1963; Nalbandian and Frank, 1962, 1963; and Frank, Wolf and Gutman, 1964). These studies have involved, for the most part, mammals of lower taxonomic classification and have been concerned with the odontogenic cells proper, i.e., the ameloblasts and odontoblasts. Few investigations have dealt with the fine structure characterization of human enamel organs prior to the appositional stage of development (Pannese and De Petris, 1960; Pannese, 1960, 1961, 1962, 1964; and Decker, 1963).

This research seeks to achieve fine

structure identification of the strata constituting the four-layered enamel organ and the basal lamina adjacent to the peripheral cells of the developing tooth germ in man.

## MATERIALS AND METHODS

Dental organs were extirpated from the developing alveolar crypts of human embryos in intrauterine development from 14 weeks to term. For routine electron microscopy the tissues were either fixed directly in osmium tetroxide according to Slaughterback's (1965) modification of Caulfield's (1957) fixative, or first fixed in glutaraldehyde followed by osmium tetroxide fixation as described by Pease (1964).

The embedding media employed included Vestopal W according to Ryter and Kellenberger (1958), Araldite 502 according to Luft (1961), or Maraglas according to Erlandson's (1964) modi-



fication of Freeman and Spurlock (1962).

In order to confirm the precise stage of development for a given tooth germ, and further to indicate the precise area from which thin sections were to be cut, thick sections ranging from 0.5 to 1.0 $\mu$  were cut with glass knives on a Porter-Blum Ultra-Microtome MT-1. The sections were then stained with toluidine blue according to Chandra and Skelton (1964). Only those specimens which were optically determined to be in the bell (morpho-histodifferentiation) stage of development were selected for ultrastructural studies.

Thin section which were cut with glass or diamond knives on a Porter-Blum Ultra-Microtome MT-2 were mounted on uncoated grids, and successively stained with uranyl acetate and lead citrate after Watson (1958) and Reynolds (1963), respectively. Examination was executed *via* a RCA EMU 2-B, Siemens Elmiskop I or I-A.

## RESULTS

Optical data derived from toluidine blue stained thick sections revealed that the components of the four layers of the enamel organ exhibited varying degrees of differentiation from the crest to the cervical loop. Since degradational changes from the summit to the cervical loop existed relative to cell morphology, cell continuity and internal structure, the tooth germ was divided into geographic areas which represent early, intermediate and late bell stages of development (Fig. 1). Thus a given enamel organ will not only be expected to contain components representing the three stages of development given but that the cytomorphic

changes of the younger cells parallel those of their older counterparts. It was interesting to note that commensurate changes in the constituents of the enveloping dental sac tissue were also noted. The ultrastructural features of the tooth germ which follow are related only to those in the early bell stage of development.

The connective tissue immediately surrounding the tooth germ was composed of fibroblasts in the dental sac which were somewhat flattened with their long axis being directed more or less parallel to the surface of the developing tooth germ. The cells were arranged in lamellae with relatively small intercellular spaces (Fig. 2) in which were found fibrous elements. The fibroblast cell extensions varied in both length and width. The centrally located nucleus occupied the larger portion of the central cell mass. At intervals the continuity of the nuclear envelope was interrupted by nuclear pores. The chromatin was more often homogeneously distributed throughout the nucleus. In some cases, however, the granules formed dense irregularly shaped masses which occupied both peripheral and more central locations (Fig. 2).

The cytoplasmic constituents included Golgi complex, endoplasmic reticulum, mitochondria, fibrils and lipid bodies. With exception of the Golgi apparatus, which was found at one or the other end of the cell, but never both, the cytoplasmic components were distributed throughout the cell. The Golgi constituents were composed of paired smooth surfaced membranes, minute vesicles and vacuoles, with the membranes aligned to form parallel arrays. The endoplasmic reticulum which formed a network of varying



complexity, consisted of cisternae, the walls of which were studded with ribosomes. Not infrequently, distended areas or groups of elements were observed in the form of small vesicles or irregular spaces. These were similarly impregnated with ribosomes (Fig. 3). Continuity between the nuclear envelope and membranes of the endoplasmic reticulum was found frequently (Fig. 4). Free ribosomes which were not numerous in the fibroblasts were scattered among the cytoplasmic organelles. The mitochondria were few in number and of varying dimensions.

The cytoplasmic inclusions were comprised of fat and glycogen accumulations. The former were large dense bodies some of which were irregular in contour. The lipid granules did not appear to be preferentially located to any particular organelle. Glycogen accumulations, which were found in the glutaraldehyde fixed and lead stained material were formed into clusters of diverse size. The individual glycogen particle attained dimensions up to 300 A. The glycogen masses were composed of many granules and could be distinguished from the RNA bodies by their larger size and increased density.

Two structures observed in the fibroblasts of the dental sac connective tissue which are not a regular constituent of all cells were the basal corpusclelike bodies and cytoplasmic fibrils. The former which were not a constant component of the fibroblasts were composed of peripheral and central filaments. Cytoplasmic fibrils which were present in the glutaraldehyde fixed specimens were observed in the cell body as well as in the processes. The fibrils were approximately 50 A in width. Since the orientation of the

fibrils was quite irregular, they could often be seen in many sectional planes. Quantitative differences in the fibril population relative to cell location could not be noted. On the other hand, regions in which a paucity of organelles occurred generally demonstrated an increase in fibril number (Fig. 2).

The formed intercellular material consisted of fibrils which were morphologically and dimensionally characteristic of mature collagen. Frequently these elements were aggregated into bundles of parallel fibers which coursed irregularly between the cells (Fig. 2).

Developing blood vessels (Fig. 5) which were located in close proximity to the outer enamel epithelium were capillaries as indicated by the absence of smooth muscle elements abutting the endothelial lining. The lumina of the vessels were circumscribed by several endothelial cells rarely exceeding three. An endocapillary layer of plasma protein was not observed. The interfaces of the cells demonstrated long interdigitating tightlike as well as groovelike junctions (Fig. 6). The microvilli which projected lumenward exclusively were few in number and were short and blunt. The cytoplasmic constituents of the endothelial cells included mitochondria, Golgi elements, endoplasmic reticulum and micropinocytotic vesicles of varying size (Fig. 7). Pericytes were occasionally found intervening between the endothelial cells and the basal lamina. The basal lamina was circumferentially located about the external surface of the endothelial cells. It measured 500-700 A in width and was separated from the cell membrane by a less dense adendothelial layer of 400 A. In instances where the blood vessel lay contiguous to the outer



enamel epithelium, the basal lamina of each maintained its identity. In other areas the intervening space was occupied by formed and unformed intercellular material.

The basal lamina of the outer enamel epithelial cells was similarly composed of a homogeneous moderately radiodense band circa 500 to 700 Å in width which was separated from the proximal cell border by a less dense layer about 400 Å wide.

The external aspects of the fibroblasts of the dental sac, the pericytes of the blood vessels and the cell components of the enamel organ were covered by a fine filamentous material probably related to the glycocalyx of Bennett (1963) (Fig. 8). Noteworthy was the fact that the density of this external covering was comparable to that of the basal lamina. While the filamentous coat was found circumambient to the cells, neither the continuity nor width was found to be constant. Relative to the enamel organ, the glycocalyx of the more deeply situated cells of the stellate reticulum appeared to be more pronounced. On the other hand, the lateral borders of the developing ameloblasts did not possess a conspicuous surface coat.

#### ENAMEL ORGAN

*Outer Enamel Epithelium.* The cells of the outer enamel epithelium were cuboidal with numerous short, blunt microvillarlike processes which appeared to be interdigitating and stacked with those of adjacent cells (Fig. 9). Serial sections revealed these to be lamellar protoplasmic sheets or folds. Some cells made contact with neighboring ones over broad surfaces. This

arrangement resulted in few intercellular spaces which were small and irregular in shape. The interfaces of cells were often marked by the junctional complexes described by Farquhar and Palade (1963). The *zonula occludens* or tight junction was most frequently encountered at the contact areas of the external aspects of the outer enamel epithelium. The desmosome was the most frequently encountered component of the complex.

The cytoplasmic organelles consisted of mitochondria, endoplasmic reticulum, Golgi complex and tonofilaments (Fig. 10). Except for the latter, the cytoplasmic components were not present in impressive numbers. The tonofilaments were found scattered throughout the cell. Often they tended to be aggregated into larger units and oriented in the cell so that a terminal became associated with desmosomes (Fig. 10).

Of special interest is the fact that maturation of the cells of the outer enamel epithelium progressed from the crest of the enamel organ to the cervical loop. The more differentiated cells tended to become squamous in shape and frequently acquired more protoplasmic processes. Their arrangement did not appear to change with alteration in cell shape.

*Stellate Reticulum.* The components of the stellate reticulum not only differed morphologically from those of the other layers, but differed relative to depth within the same layer. A comparison of the cells within the stellate reticulum revealed that with departure from the marginal region toward the stratum intermedium, the cells varied from polygonal through stellate to spindle shaped (Figs. 9 and 11). Al-



terations in cell contour were accompanied by an increase in the length of the protoplasmic extensions. The cells in the more central area of this layer possessed extremely long and often attenuated processes with secondary branches. With lengthening of the processes, the intercellular spaces tended to increase in size. Those cells immediately bordering the stratum intermedium resumed the stellate and polygonal shapes.

Of the three junctional complexes, the desmosomes (Figs. 12 and 13) were the most numerous. In general, they were not as frequently encountered as in the outer enamel epithelium.

The quantitative aspects of the various organelles and inclusions in the stellate reticulum were not unlike those of the outer enamel epithelium except for the tonoclements. The latter appeared to be fewer in number and often associated with the desmosomal connections.

The most conspicuous feature of the stellate reticulum was the glycocalyx. The external mucopolysaccharide coating was found to cover completely the free surface of the cell bodies and their processes. While the thickness of the surface coating was initially not substantial, as the early stage of development progressed, it appeared to accumulate (Figs. 12 and 13).

*Stratum Intermedium.* The stratum intermedium which was several cell layers in thickness consisted of flattened cells which followed the contour of the basal ends of the inner enamel epithelium. Morphologically these cells were more similar to those of the peripheral cells of the stellate reticulum than the adjacent ones. The components of the stratum intermedium dif-

fered from those of the outer cells of the stellate reticulum in that the cell extensions of the latter were more numerous, longer and more slender and freely interdigitated with those of the adjacent cells. Because the cell bodies and their processes were more closely packed, the intercellular spaces were smaller. While microvillarlike structures were present, they were neither numerous nor stacked as in the outer enamel epithelium.

The nuclei of the cells in the stratum intermedium assumed a central position, and as in the case of the stellate reticulum, they occupied most of the cell body (Figs. 14 and 15). While the organelles included Golgi elements, endoplasmic reticulum, filaments and mitochondria, they were found in such reduced numbers that the cytoplasm presented a more or less homogeneous moderately electron dense texture.

*Inner Enamel Epithelium.* The cells were columnar, one terminal of which contacted and conformed to the contour of the stratum intermedium, the other of which was bordered by the basal lamina adjacent to the dental papilla. The lateral borders of the prospective ameloblasts were relatively straight except for shallow undulations. Microvilli were often located in the intercellular spaces.

Deviations in the course of adjacent lateral membranes resulted in simple intercellular spaces of varying size. Components of the junctional complexes were of less frequent occurrence. The desmosomes were more often present associated with the lateral limiting membranes. Neither a basal nor distal terminal bar system was in evidence.

The morphology and internal organization of the preameloblasts were in



harmony with the anticipated structure of secretory cells in an early period of development. The nuclei were oval in shape and appeared to be migrating toward the basal cell terminal. In this regard, the cell base was determined, not in relation to the location of the basal lamina but relative to the final position of the nucleus. The variety of organelles in the cells of the inner enamel epithelium duplicated that of the other strata. Except for the tonoelements, the numerical status of the various organelles was greatest within the inner enamel epithelium. The cytoplasmic organelles in the basal portion of the cell included mitochondria, ribosomes, rough surfaced vesicles of the endoplasmic reticulum, Golgi bodies and tonofilaments (Fig. 15). Since the cytoplasm lateral to the nucleus was sparse, the organelles and inclusions were reduced in number (Fig. 16). In this area only a few mitochondria, free ribosomes and filaments were found. The remaining or distal segment of the developing ameloblast contained Golgi structures, endoplasmic reticulum, tonoelements, secretion granules and small aggregates of glycogen (Fig. 17).

The morphologic and cytologic features of the enamel organ changed dramatically with advancing age of this structure. Because of this, the bell stage has been divided into early, intermediate and late periods. Characterization of the later periods of development are described elsewhere in this volume of *THE JOURNAL* (Fischlschweiger, Provenza and Sisca, 1967).

## DISCUSSION

Electron microscopic investigations of the developing enamel organ have

been restricted to the lower vertebrates (Pannese, 1960, 1961, 1962 and 1964; Decker, 1963 and Kallenbach, 1966). In general, the ultrastructural features of the outer enamel epithelium in human tooth germs observed in this study during the early bell stage were not unlike those of lower animals (Pannese, 1960, 1961, 1962 and 1964; Decker, 1963).

The areas of agreement which principally involve the early bell stage of development are concerned with cell morphology, intercellular spaces, cell surface modifications and internal structure of the cell components. Morphological and cytological characteristics of the cells in the four layers of the human tooth germ are similar to those of rodent, feline and bovine material as reported by Pannese (1960, 1961, 1962 and 1964) and Decker (1963). The cell surfaces of the enamel organ components, human in this study and animal above, bore microvillarlike projections or were otherwise modified.

Plicated surface membranes and their modifications, the microvilli, which were a constant feature in the cell components of all strata of human fetal tooth germs agree with their presence in the enamel organs of other mammals (Pannese, 1960, 1961, 1962 and 1964; Decker, 1963 and Kallenbach, 1966), and in other epithelia such as epidermis (Odland, 1958) and oral epithelium (Stern, 1965). It has been postulated that these alterations in surface continuity with the support of the appropriate organelles participate in a) the cell's secretory activity (Pannese, 1960), b) the control of electrolyte concentration (mitochondrial pump concept) (Kallenbach, 1966), c) cell membrane transfer by increasing surface



area (Fawcett, 1962), and d) macromolecular transfer by micropinocytosis (Odland, 1958).

The arrangement of the cells of the various strata which affect the dimensional aspect of the intercellular spaces exhibits similar harmony; that is, the size and number of the spaces in the stellate reticulum are greater than those of the other three layers. If one of the functions of the stellate reticulum is to increase the size of the intercellular spaces in order to provide for the enamel organ an enlargement of the overall spatial area in anticipation of amelogenesis, then plications and alterations in cell shape as experienced in the enamel organ are a necessity, since this activity cannot be accomplished *via* cell multiplication as substantiated by autoradiographic studies (Engler, Ramfjord and Hinkler, 1965). It has been suggested that surface undulations assist in altering the cell's shape from spherical to squamous as well as providing for changes in cell volume without appreciably affecting the surface area (Odland, 1958).

Two features associated with the human tooth germs which have not been reported for their animal counterparts involve the presence of junctional complexes other than desmosomes (*zonula adherens* and *zonula occludens*) and the presence of a glycocalyx coating over the surface of the enamel organ components. While Panese (1960, 1961, 1962 and 1964) did report the intercellular bonds (desmosomes), other components were not observed. In the present study, the presence of the tight junctions (*zonula occludens*), which exclusively comprised the attachment device of the external

aspects of the outer enamel epithelium, were expected since the function of this component is to act as a diffusion seal for material located outside the enamel organ. In this investigation a surface coating, variously referred to as the "cement" or "gap" substance, glycocalyx, external lamina, boundary layer and glycoprotein mantle (Bennett, 1963; Fawcett, 1962, 1964 and 1966; and Pease, 1966) was found on the cells' surfaces of the enamel organ. Other than epithelial cells, the extracellular coat has been described in a diversity of cells including fibroblasts, striated and smooth muscle cells, pericytes and Schwann cells (Bennett, 1963; and Fawcett, 1966). This study expands the presence of an external polysaccharide lamina to include fibroblasts and blood vessel components in embryonal tissues of the dental sac and adds to the list of cells the constituents of the tooth germ. The glycocalyx has been observed covering the free surfaces of the cells of the outer enamel epithelium, the stellate reticulum and to some extent, the stratum intermedium during the early bell stage of development. Maximum width of the glycocalyx was invariably noted in the stellate reticulum. It has been proposed that the glycoprotein mantle participates in strengthening the intercellular bonds (Pease, 1966). Similarly, it has been suggested that the glycocalyx functions as a medium through which diffusion of ions and molecules can be effected (Pease, 1966).

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Fig. 1. Optical micrograph of a human tooth germ in the bell stage of development. The areas representing the early (E), intermediate (I) and late (L) bell stage are indicated. x 200

Fig. 2. Electron micrograph of dental sac. Several fibroblasts in the dental sac displaying arrangement and distribution of intra- and extracellular components. The chromatin in the nuclei (N) appears to be condensed locally. Fine cytoplasmic fibrils may be seen throughout the cell (indicated by arrows). Other cytoplasmic components include endoplasmic reticulum (ER) and mitochondria (M). Collagenous fibrils (Co) are seen cut through different planes. Human fetus, 5½ months. Fixation: Glutaraldehyde-OsO<sub>4</sub>-Millonig. Embedding: Maraglas. x 34,500









Fig. 3. Electron micrograph of fibroblasts in the dental sac. Note continuity of rough surfaced endoplasmic reticulum (ER) with the outer nuclear membrane (arrows). Nucleus (N).  
x 57,500

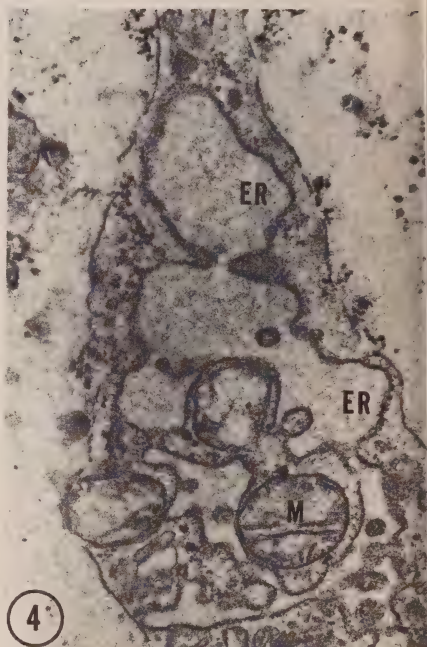


Fig. 4. Electron micrograph of fibroblast in the dental sac showing distended areas of the rough surfaced endoplasmic reticulum (ER). Mitochondrion (M) and collagenous fibrils (Co.)  
x 26,000





Fig. 5. Electron micrograph of developing blood vessel (BV) in the dental sac. Several fibroblasts (Fi) and their processes are noted intermingled with collagenous fibrils (Co.)  
x 11,000



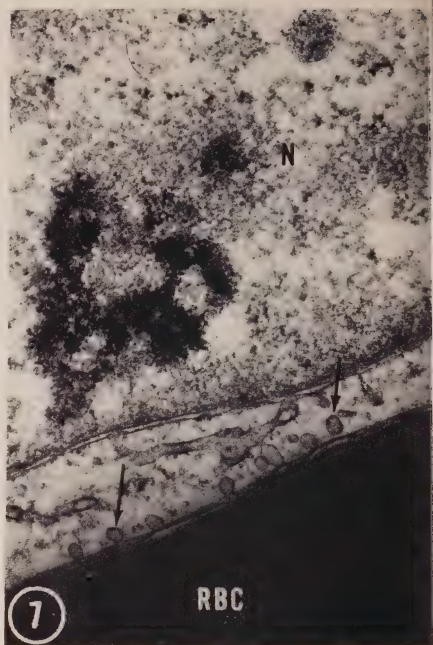
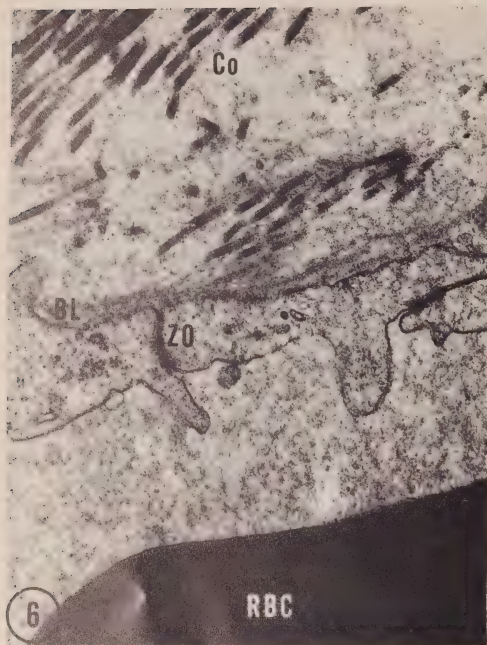


Fig. 6. Electron micrograph of a blood vessel in the dental sac demonstrating tightlike junctions (ZO) between endothelial cells, basal lamina (BL) and part of a red blood corpuscle (RBC) in the lumen. Collagenous fibrils (Co) surround the blood vessel. x 40,250

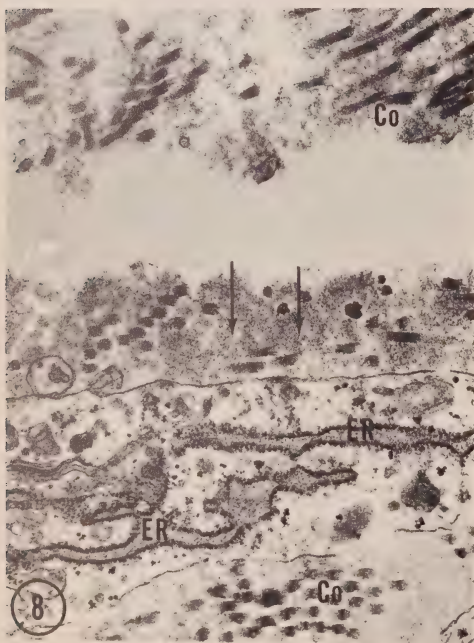


Fig. 7. Electron micrograph of an endothelial cell segment in the dental sac. Illustrated are nucleus (N) and several micropinocytotic vesicles (arrows). A red blood corpuscle (RBC) fills the lumen completely. x 38,000

Fig. 8. Electron micrograph of cytoplasmic process of a fibroblast in the dental sac. Note rough surfaced endoplasmic reticulum (ER). The process surface is covered by a thick glycocalyx layer (arrows). Collagenous fibrils (Co) are seen in the intercellular space. x 40,250



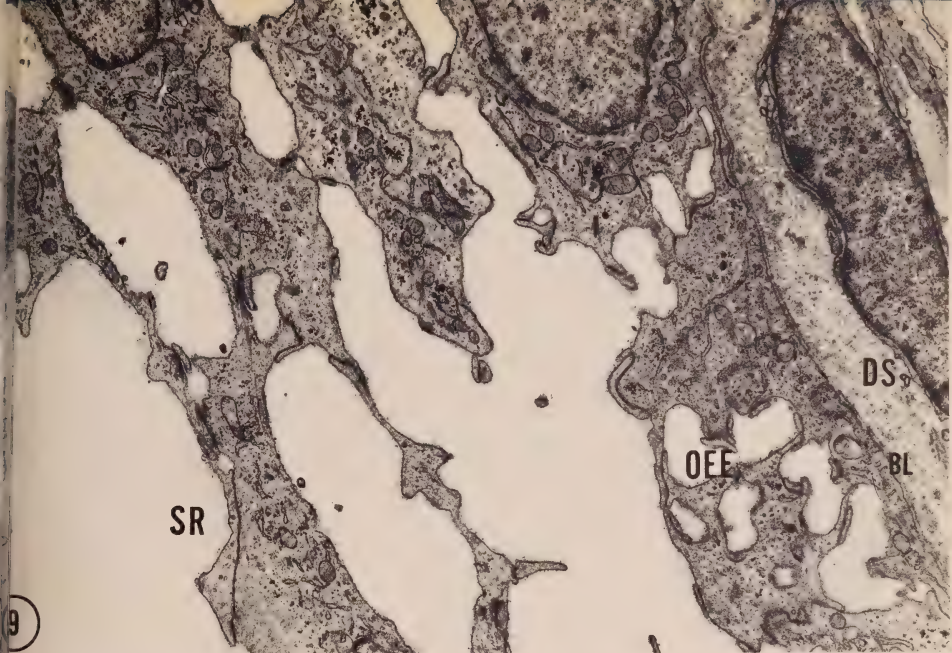


Fig. 9. A basal lamina (BL) separates the dental sac (DS) from the enamel organ. The latter is represented here by cells of the outer enamel epithelium (OEE) and stellate reticulum (SR) x 9,000

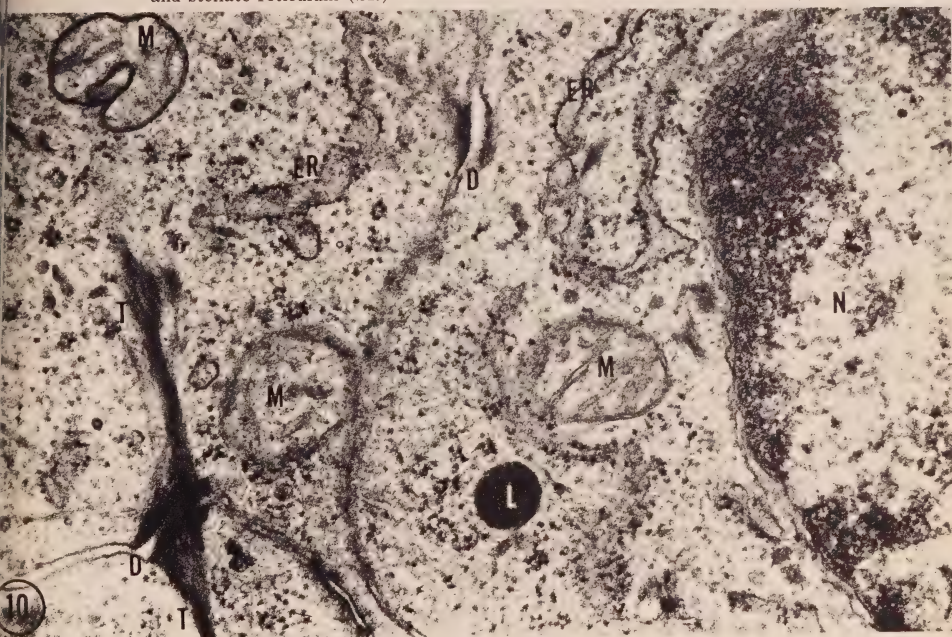


Fig. 10. Electron micrograph of details of outer enamel epithelial cells at higher magnification. Organelles such as endoplasmic reticulum (ER) and mitochondria (M) are present in abundance. Lipid (L) is not of frequent occurrence. Tonofilaments (T) tend to fan out at the desmosomes (D). Nucleus (N). x 46,000



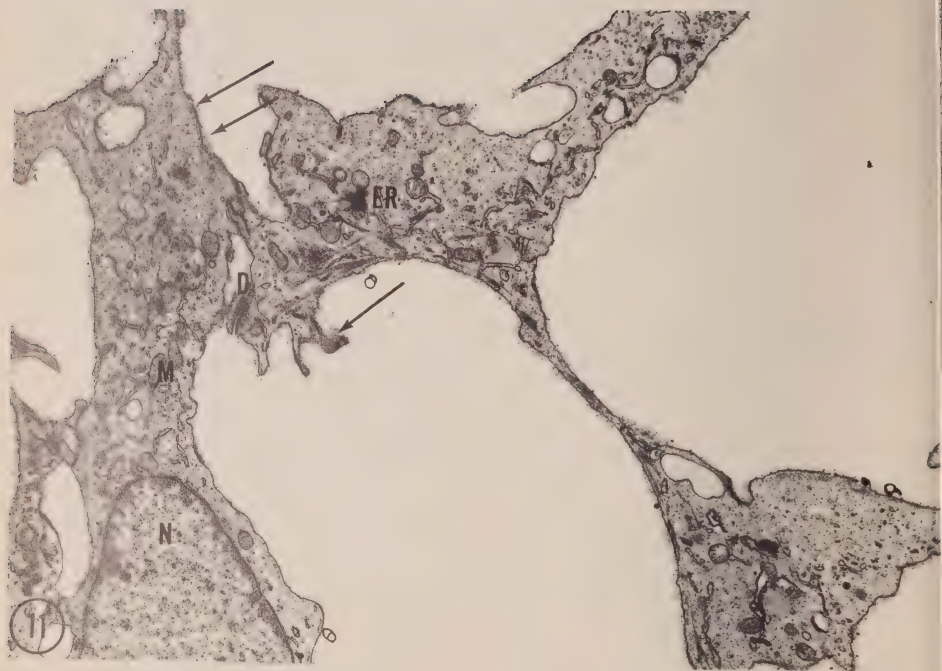


Fig. 11. Electron micrograph of stellate reticulum cells exhibiting organelles: nucleus (N), mitochondria (M) and endoplasmic reticulum (ER). The cells are connected with each other by overlapping cell processes and desmosomes (D). Note glycocalyx indicated by arrows.  
x 9,200



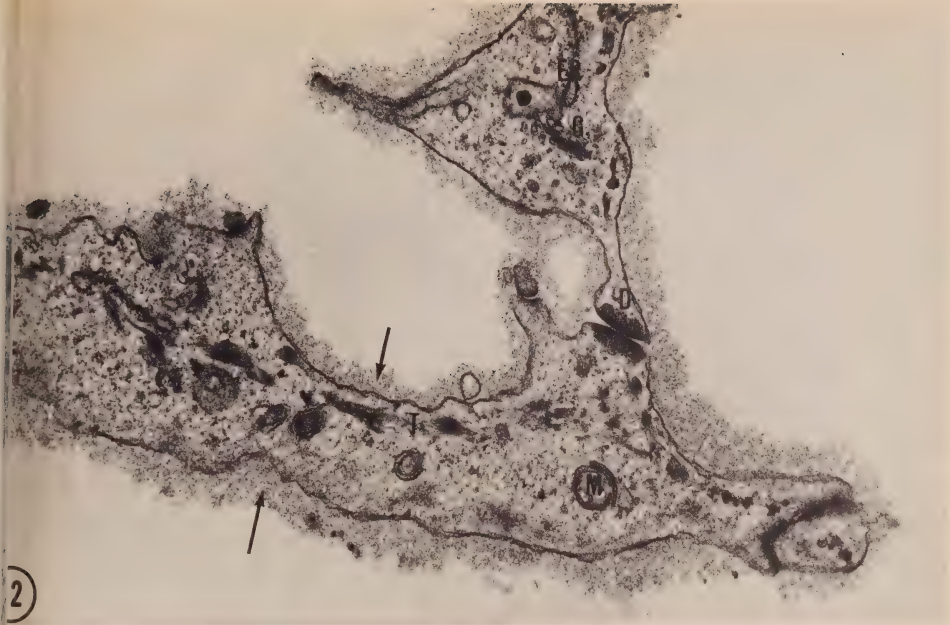


Fig. 12. Two cell processes of the stellate reticulum connected by a desmosome (D). Organelles such as endoplasmic reticulum (ER), Golgi (G), mitochondria (M) and tonofilaments (T) are present. The outer aspects of these processes are covered with a very fine filamentous material, the glycocalyx (arrows). x 34,500

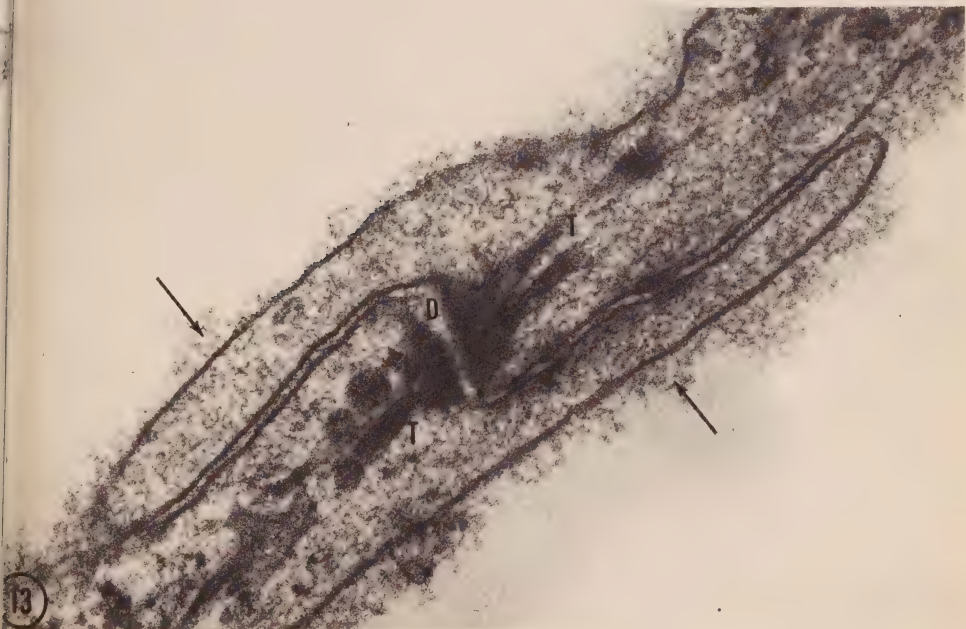


Fig. 13. An area similar to that of Figure 11 at higher magnification. Tonofilaments (T) are in contact with a desmosome (D). Note the overlapping of process terminals. Arrows indicate glycocalyx material. x 84,000



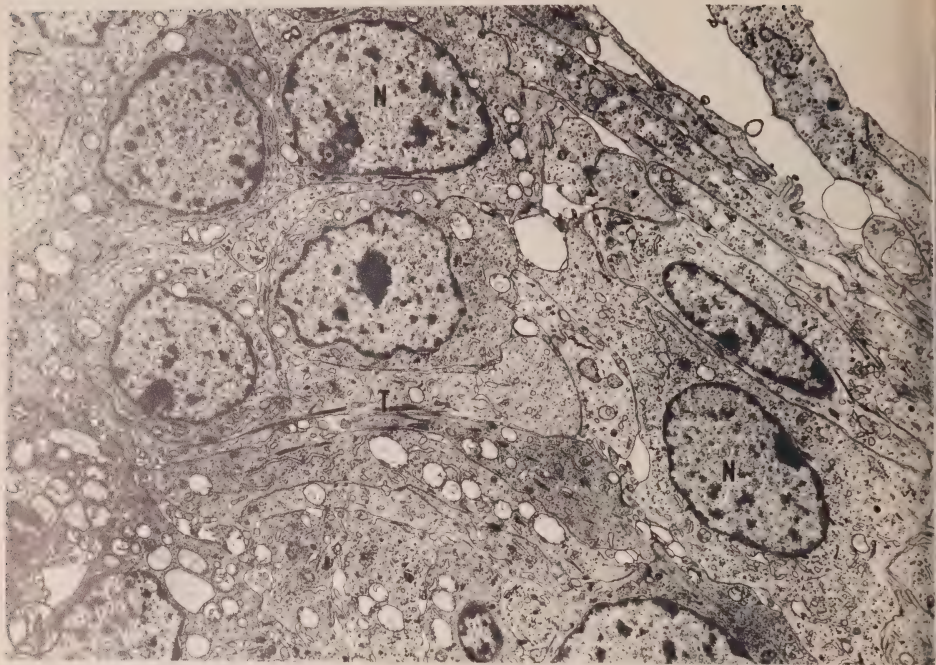
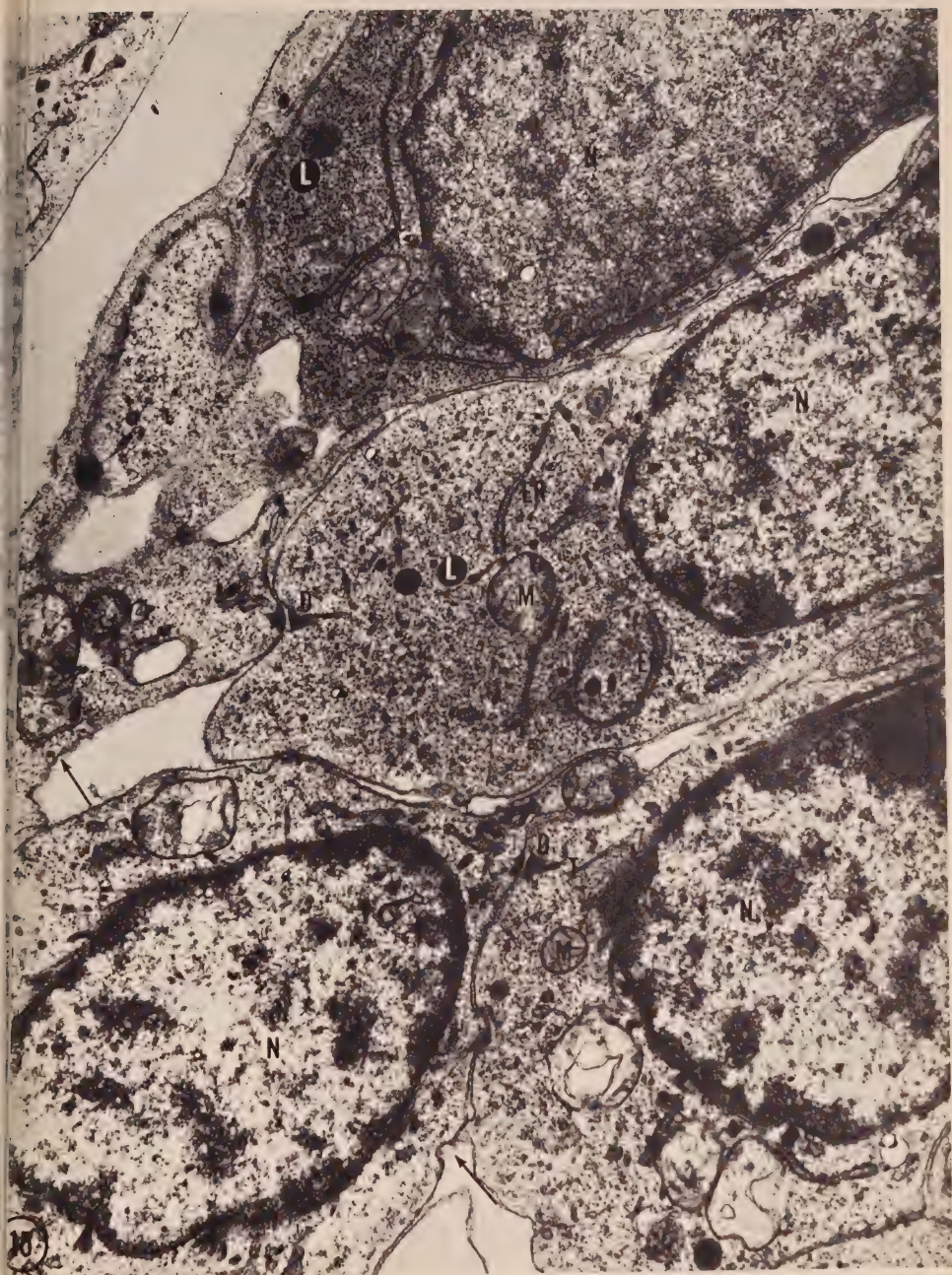


Fig. 14. Electron micrograph of stratum intermedium. Note cells are closely packed. Their nuclei (N) occupy the greater portion of the cell body. Some tonofibrils (T) can be seen. Note homogeneity of cytoplasm. x 6,900

Fig. 15. Electron micrograph of basal portion of three preameloblasts, two of which are in contact with a cell of the stratum intermedium. The nuclei (N) of the preameloblasts have assumed a basal position in the cells, surrounded by cytoplasm containing endoplasmic reticulum (ER), mitochondria (M), tonofibrils (T) as well as lipid (L). Contact with cells of the stratum intermedium is established *via* desmosomes (D). Note glycocalyx indicated by arrows. x 30,000







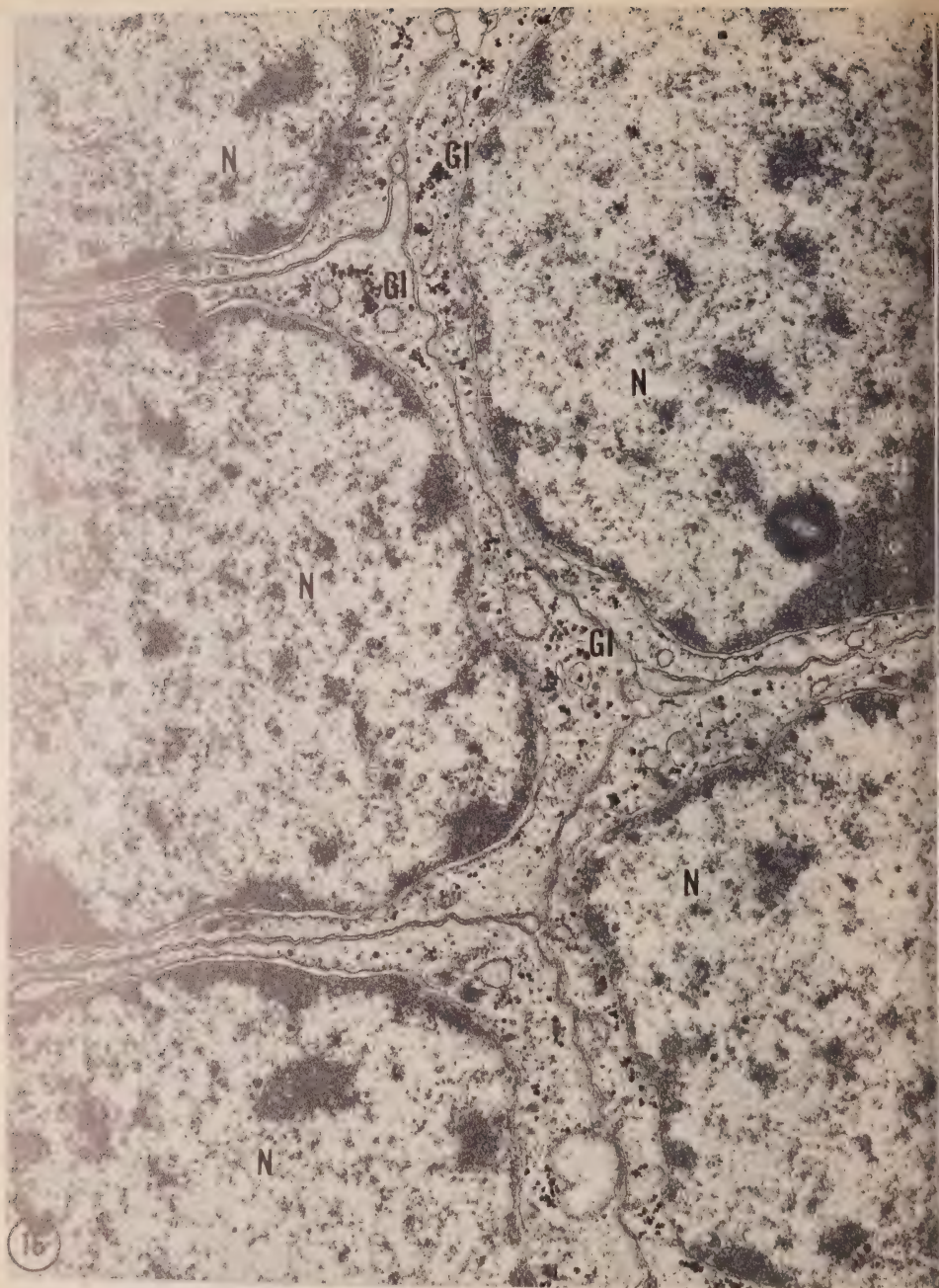


Fig. 16. Basal portion of five preameloblasts sectioned transversely. The nuclei (N) are surrounded by a narrow zone of cytoplasm in which are found a few organelles and patches of glycogen (Gl).  
x 36,000



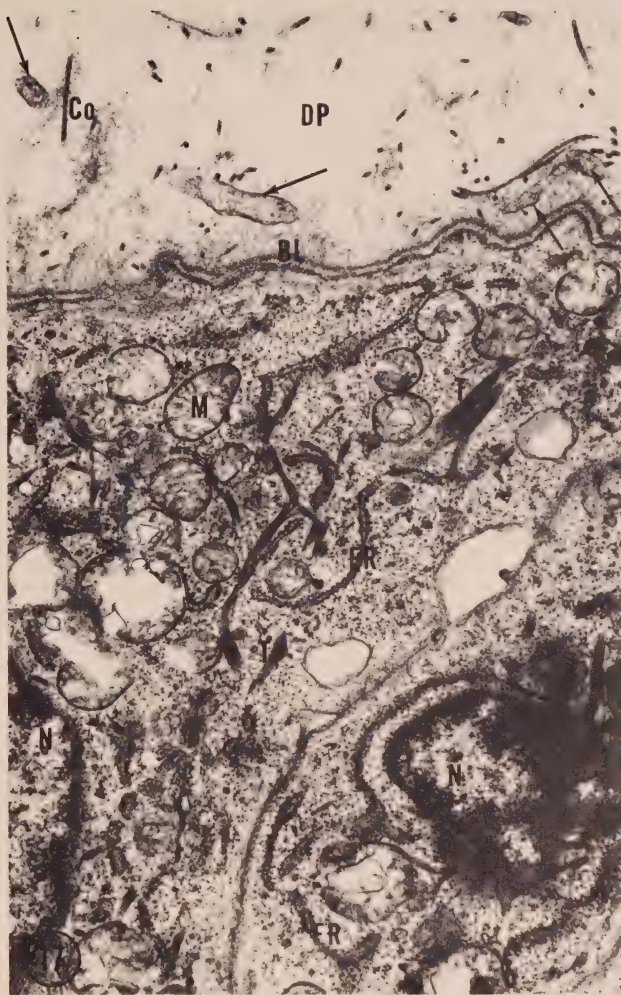


Fig. 17. Electron micrograph of preameloblasts. The cytoplasm contains mitochondria (M), endoplasmic reticulum (ER) and tonofilaments (T). A basal lamina (BL) separates the preameloblasts from the dental papilla (DP). Several cell processes (arrows) and collagenous fibrils (Co) are found in the dental papilla.  
x 27,000



# Reorganization Of The Peripheral Layers Of The Human Enamel Organ During The Bell Stage— An Electron Microscopic Study

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**SUMMARY**—Optical and electron microscopic examination of human tooth germs revealed that the morphologic features as well as the internal structure of the cells of the outer enamel epithelium and stellate reticulum were generally retained with continued development of the enamel organ. Dramatic reorganizational changes in the topography of these strata were observed. Beginning at the summit of the tooth germ and extending cervically the continuity of the outer enamel epithelium was destroyed by the reorganization of these cells into clusters with large intervening spaces. A basal lamina surrounded

each cluster and outlined the spaces which were occupied by connective tissue elements. The ultimate fate of the outer enamel epithelium appeared to parallel that of the parent lamina and the root sheath. The absence of a glycocalyx indicated a physiological change in the stellate reticulum. It is proposed that with the disappearance of the glycocalyx, voids are produced which are filled by an advancing front of the basal lamina followed by connective tissue constituents. With continued extension of the boundaries of the basal lamina, the organization and identity of the stellate reticulum is progressively diminished.

## INTRODUCTION

Various concepts pertaining to the reorganization of the outer strata of the enamel organ during the bell stage of tooth development have been proposed based on optical microscopy and more recently interpreted in terms of electron microscopic data.

Williams' (1882, 1896) concepts of the enamel organ and of the massive changes which the constituents undergo were quite primitive. For example, he believed that the stellate reticulum consisted of a solid mass of tissues and that the cytoplasm of the cells disappeared on tissue preparation leaving voids. The outer enamel epithelium was noted to form papilliform structures surrounded by capillary loops. With the disappearance of the cells of the stellate reticulum, the papillary

structures fall to rest and coalesce with the stratum intermedium. Dental sac tissue containing the capillary loops occupied the spaces between the papillae. It was also noted that blood vessels were never observed in the stellate reticulum. It is interesting to note that the papillary layer of Williams (1882, 1896) which consisted of the epithelial buds of the outer enamel epithelium, stratum intermedium and ameloblastic layer is similar componentwise to that of Churchill (1935). Churchill (1935) based on the work of Meyer was of the opinion that with the apposition of enamel, the ameloblasts and overlying stratum intermedium receded into the stellate reticulum. With continued movement of the inner layers of the enamel organ peripherally, the stellate reticulum disappears and the outer



enamel epithelium, stratum intermedium and ameloblastic layers fuse to form the *united enamel epithelium*. Schour and Massler (1940) and McHugh (1961, 1963) reported that the four-layered enamel organ decreased dimensionally and consisted of an outer layer composed of components of the outer enamel epithelium, stellate reticulum and stratum intermedium and an inner layer composed exclusively of retrograde ameloblasts. The outer layer and inner layer are defined at this stage as the *reduced enamel epithelium*. Diab, Stallard and Zander (1966) demonstrated that with the initiation of the appositional stage of development capillaries invade the degenerating outer enamel epithelium effecting separation of it from the other cell strata and atrophy of the stellate reticulum. The remaining layers form the reduced enamel epithelium.

Except for Schour and Massler (1940), and McHugh (1961, 1963) most investigators are of the opinion that the reduction in the dimensional aspect of the enamel organ to form the reduced enamel epithelium is a result of the disappearance of the stellate reticulum. The mechanism involved in the process has been variously disputed. Legros and Magitot (1873) and Kölliker (1863, 1899) were of the opinion that the components of the stellate reticulum experienced resorption, while Addison and Appleton (1922), Bolk (1928) and Santoné (1935) and more recently Diab *et al.*, (1966) were of the opinion that the cellular elements of the stellate reticulum were destroyed by the invading connective tissue elements and blood vessels of the dental follicle.

Optical and corresponding supporting electron microscopic data of the

enamel organ have been provided by Pannese and DePetris (1960), Pannese (1960, 1961, 1962 and 1964), Decker (1963) and Kallenbach (1965). Pannese (1964) has indicated that the components of the enamel organ, especially the stellate reticulum, involute *via* a process of keratinization and a layer of reduced enamel epithelium remains circumambient over the developing crown. Decker (1963) reports deep indentation of the outer enamel epithelium with capillaries present in the dental sac material located in the area. Kallenbach (1965) perpetuating the obsolete terminology of Williams (1882, 1896) described the ultrastructural features of the papillary layer which in current parlance is known as the reduced enamel epithelium.

Sisca, Provenza and Fischlschweiger (1967) have divided the bell stage of development into early, intermediate and late on the basis of morphologic and cytologic changes which transpire with aging. Characterization of the components of the early bell stage was reported based on electron microscopic data. The present study seeks elucidation of several questions:

- 1) What are the morphological changes and alterations in the intercellular relationships of the peripheral layers of the enamel organ during the bell stage as observed by light and electron microscopy?
- 2) How do these changes correspond with those observed in other cell strata of the enamel organ and what is their possible relationship?



## MATERIALS AND METHODS

The procedures as described by Sisca *et al.*, (1967) have been employed for fixation, embedding, thick and thin sectioning and staining. Electron microscopic examination was made on a Siemens Elmiskop IA electron microscope at 80 KV, using 30 and 50 $\mu$  ultrathin gold apertures. Accessory equipment used for this study included: pointed filaments, decontamination device and electromagnetic shutter.

Photographs were taken on Kodak projector slide plates, electron image plates and on Kodalith LR 70 mm film, all developed in D-19 or HRP developer according to the manufacturer's specifications with the exception of Kodalith LR film for which, due to extreme contrast, specific development procedures had to be employed. Findings with respect to this photographic material will be published elsewhere.

## RESULTS

The peripheral layers of the developing enamel organ consisted of the outer enamel epithelium and the adjoining areas of the stellate reticulum. Although the surrounding dental sac is not considered an integrated part of the enamel organ it will be described in detail due to its close relation to and interaction with the peripheral layers of the enamel organ.

### Light Microscopic Observations

*Early Bell Stage.* A relatively dense connective tissue in which small blood vessels were irregularly dispersed covered the external aspect of the enamel organ. The outer enamel epithelium in all areas except the cervical loop consisted of a monolayer of more or less

cuboidal cells, containing a spherical nucleus (Fig. 1). Under higher magnification one or two nucleoli were noted. These cells appeared to be in direct contact with those of the stellate reticulum. Stellate reticulum cells were somewhat irregular in size and shape with ovoid or elongated nuclei. The cervical loop area exhibited a slight increase in the thickness of the outer enamel epithelium (Fig. 2). Here it acquired a double or triple layer, probably due to more active mitosis.

*Intermediate Bell Stage.* Beginning at the summit of the enamel organ, the outer enamel epithelium was thrown into numerous folds which effected irregularity of contour (Fig. 3). The outer enamel epithelium was transformed into a multilayered stratum. It was interesting to note, that mitotic activity was never observed in this area either optically or electron microscopically. It appeared reasonable to assume, therefore, that the multilayered epithelium was the result of topographical reorientation rather than cell division. Immediately subjacent to the area of cell rearrangement, was found a slight increase in the number of stellate reticulum cells. This was probably a result of local condensation of the cells in these areas (Fig. 3). The density of the dental sac material on the other hand appeared to decrease and certain areas often contained small blood vessels in close proximity to the outer enamel epithelium.

*Late Bell Stage.* Cells of the outer enamel epithelium in the late bell stage were clumped together to form epithelial clusters which were separated from one another by dental sac elements (Fig. 4). The blood vessels and connective tissue elements were observed



not only surrounding the cell clusters but often found in close contact with components of the stellate reticulum. Some stellate reticulum cells contributed to the clusters of the outer enamel epithelium while others formed clusters themselves.

#### Electron Microscopic Observations

**Early Bell Stage.** A morphological description of the cells of the outer enamel epithelium and stellate reticulum in the early bell stage was reported by Sisca *et al.*, (1967).

The relationship of the outer enamel epithelium to dental sac was such that the enamel organ was surrounded by an electron dense basal lamina, about 500-700 Å thick. The basal lamina was separated from the external plasmalemma of the outer enamel epithelium by an adepithelial, electron diffuse area of approximately 400Å in width (Fig. 5). Bundles of collagenous fibrils in the dental sac followed the regular contour of the basal lamina. The cuboidal outer enamel epithelium components made contact with adjacent cells by desmosomes and tight junctional complexes. The intercellular spaces into which cytoplasmic processes extended were relatively small.

**Intermediate Bell Stage.** The cuboidal shape of the cells of the outer enamel epithelium was retained at the initiation of the intermediate bell stage (Fig. 6). The nucleus appeared normal and the organelle complement including mitochondria, endoplasmic reticulum, Golgi complex, secretion granules and tonolements was abundantly in evidence. Certain signs, however, which indicated changes in the intercellular relationship were noted. For example, the cells were in the process

of shifting their position so that ultimately the epithelium assumed a double or triple layer. Further, some desmosomes displayed signs of an increase in the width of the intercellular gap. This indicated a loosening of the intercellular attachment apparatus. Nuclei appeared somewhat irregular in contour and sometimes demonstrated initial signs of pleomorphism such as indentation.

The dental sac material was altered relative to cell dominance because mesenchymal cells appeared in the immediate neighborhood of the enamel organ and replaced the fibroblasts. Many of these mesenchymal cells were observed to develop into small blood vessels (Fig. 7). The smooth contoured basal lamina of the early stage which separated the outer enamel epithelium from the dental sac was thrown into numerous folds in the intermediate bell stage. It continued, however, to follow the contour of the outer enamel epithelial cells. As development in the outer enamel epithelial cells progressed, an increase in the quantitative aspects of both the endoplasmic reticulum and glycogen was noted and lipid accumulations made an appearance. Advanced symptoms which indicated cell relocation included a shifting of organelle location to occupy a more central position in the cell. This resulted in the formation of a peripheral ectoplasmic layer (Fig. 8). A disruption in the cytoskeleton occurred as evidenced by the absence of tonolements in the ectoplasm and their tendency to break up into shorter bundles. Due to the cellular movements, one observed a collapse of many cytoplasmic processes in the intercellular spaces which increased in number and size.



The stellate reticulum components immediately adjacent to the outer enamel epithelium exhibited a developmental trend in which the cells shifted position, resulting in areas of extensive overlapping of cellular processes (Fig. 9) in contrast to the short stacked condition described for the early bell stage by Sisca *et al.*, (1967). The prominent glycocalyx which was described by Sisca *et al.*, (1967) covering the surfaces of the stellate reticulum cells in the early bell stage was not in evidence in the intermediate bell stage.

At the height of the intermediate bell stage, it was noted that the ectoplasmic layer reached maximum development, large irregularly shaped vacuoles appeared in the cell and the mitochondria often assumed horseshoe profiles. The glycogen accumulations which were at their peak, were 1) interspersed with the cisternae of the endoplasmic reticulum, were 2) found to envelop the vacuoles or were 3) intimately associated with the concavities of the mitochondria (Figs. 10, 14 and 17). Of special interest was the observation of glycogen masses which were found as membrane bound bodies in the intercellular spaces. It was significant to note that, in general, cytomorphic changes of the constituents of the stellate reticulum were somewhat retarded when compared to those of the outer enamel epithelium. Accordingly, then, in a given section it was possible to find the cells of the two strata in varying stages of development (Fig. 11).

The most striking features of the outer enamel epithelium and stellate reticulum, during the intermediate stage, involved a) the protoplasmic processes, b) the size and contents of the intercellular spaces, c) the junc-

tional complexes and d) the disappearance of the glycocalyx. Changes in cell shape from the peripheral region to the deeper portion of this layer were accompanied by a decrease in length and number of the cytoplasmic processes. Additionally, the cell extensions often appeared attenuated and exhibited less branching (Fig. 12). Due to the shifting in cell position, the cell processes did not always contact adjacent ones. This resulted in the formation of larger and more irregular intercellular spaces in which free processes of varying lengths and often atypical shapes projected (Figs. 12 and 13). Of particular significance, was the fact that in most cases, the protoplasmic processes contained a minimum population of organelles which consisted, for the most part, of a few isolated strands of endoplasmic reticulum, tonoelements and inclusions. In the threadlike processes, organelles were totally wanting (Fig. 13). An interesting observation involved membrane structures in the intercellular spaces which were of varying size and shape and which always lacked internal structure (Figs. 12 and 13). Because of their close proximity and intimate association with the bizarre shaped protoplasmic processes, one was tempted to speculate that these structures were derived from the cell projections and represented a degenerative phenomenon. Where contact existed between adjacent cell processes, various types of junctional complexes were observed which exhibited differing degrees of structural integrity depending upon the stage of development (Figs. 12 and 13). Relocation of the basal lamina in areas previously occupied by enamel organ components occurred *via* the contact areas in which continuity



of the junctional complex constituents had been lost (Fig. 14).

**Late Bell Stage.** This period was characterized by the formation of peninsulas or cell clusters (epithelial nidi) from outer enamel epithelial cells (Figs. 15 and 16). With continued deepening of the clefts advanced by the basal lamina and followed by the dental sac constituents, more and more of the stellate reticulum became involved (Figs. 15 and 16). The changes which occurred in the stellate reticulum paralleled those of the outer enamel epithelium. This was particularly patent in the more peripheral cells of the stellate reticulum (Fig. 15). The cells which formed epithelial nidi tended to assume a rounded appearance while others appeared to degenerate. Thus, cells of the outer enamel epithelium and those of adjacent areas of the stellate reticulum, in time, resembled one another increasingly. In some instances, however, it was possible to distinguish the two cell types on the bases of the glycogen which was present in the stellate reticulum (Fig. 15). The cytoplasmic processes of the latter group became shortened and decreased in number. This created larger, more irregular intercellular spaces (Fig. 15). The diminished length of the cell processes resulted in the loss of intercellular contact.

During cluster formation, the participating cells exhibited interesting cytologic changes. For example, the glycogen accumulations disappeared and lipid bodies appeared. Often the lipid was related to nuclear indentation and to the formation of electron dense lamellae-like structures (Fig. 18). The ectoplasmic zones persisted in local areas, while in others, peripheral migration

of the organelles obliterated the ectoplasmic zone (Figs. 17, 18 and 19).

Each epithelial cluster was enveloped by a basal lamina (Fig. 16). The distance between cell clusters widened as connective tissue elements and blood vessels filled the intervening space (Fig. 16). Areas in which blood vessels were in close proximity to the clusters of reorganizing cells invariably were separated by independent basal laminae, one for the vascular channel and the other for the epithelial cells (Fig. 16).

With continued maturation of the epithelial clusters, the ectoplasmic layer was reduced in width by the peripheral migration of organelles. The cytoskeleton of tonoelements tended to become reestablished and with closer packing of the cells, the junctional complexes were reconstituted (Fig. 19). Some cells contained in an epithelial nidus were apparently incapable of recuperation and these continued to degenerate (Fig. 18).

## DISCUSSION

Because significant differences have been observed in the human tooth germ during the later morphodifferentiation stage of development, subdivision of the bell stage into an early, intermediate and late stage of development was made in this study.

Departure from accord between this and previous investigations appears in the intermediate and late bell stages of development and the areas of disagreement center about 1) the ultimate fate of the peripheral layers of the enamel organ, 2) involutional changes reported by Pannese (1961 and 1964) in the constituents of the outer enamel epithelium and stellate reticulum, and 3)



certain intracellular and extracellular features heretofore not reported in animal dental germs.

One of the traditional concepts relative to the ultimate compositions of the enamel organ components based on optical microscopy was one in which two cell layers are produced, an "outer" one consisting of compressed components of the outer enamel epithelium, stellate reticulum and stratum intermedium and an "inner" layer composed exclusively of retrograde ameloblasts (McHugh, 1961 and 1963; Schour and Massler, 1940). The proponents of the second school of thought are of the opinion that the stellate reticulum disappears and that the resulting enamel epithelial structure consists of the remaining 3 cell layers (Legros and Magitot, 1873; Williams, 1882, 1896; Kölliker, 1899, Addison and Appleton, 1922; Bolk, 1928; Santoné, 1935 and Diab *et al.*, 1966). Except for Legros and Magitot (1873) and Kölliker (1899) the advocates of the second concept believed that the cells of the stellate reticulum experience obliteration by the influx of connective tissue elements and blood vessels from the dental sac. The growth of blood vessels through the outer enamel epithelium and into the substance of the developing tooth germ has been studied with considerable interest especially since it has been traditionally held that these vascular channels provide the sole source of nutritive material for the rapidly developing and differentiating ameloblasts. Mummery (1922) demonstrated that the external epithelium is interrupted by openings which permit blood vessels to lie in close apposition to the cells of the stellate reticulum. Jump

(1938), Glasstone (1960) and Bernick (1960) described similar findings, though for a slightly later developmental period, that is, after the beginning of amelogenesis. Glasstone (1964) concluded from tissue culture experiments that a rich blood supply was necessary for enamel formation.

While there is little doubt in the authors' minds that an adequate vascular supply to the stratum intermedium and inner enamel epithelium has great significance relative to metabolic material transport to the ameloblasts few workers (e.g. Glasstone, 1960) have considered the fact that during the bell stage of development blood vessels cannot possibly contribute significantly. Since it is in this stage that the cells of the inner enamel epithelium develop and differentiate in a short period of time, it is also necessary that they be furnished with increased quantities of metabolic material.

From the electron microscopic data presented in this paper it is reasonable to assume that the metabolites needed for ameloblast development are not solely derived from the vascular element of the dental sac. Rather they must be provided by sources residing within the tooth germ as will be discussed subsequently.

The electron microscopic studies of Pannese (1961, 1964) indicate involutional changes of both the outer enamel epithelium and stellate reticulum.

The present study involving human material demonstrated conclusively that the remnants of the peripheral layers of the enamel organ (outer enamel epithelium and stellate reticulum) formed epithelial nidi. The mechanism associated with this process involved the components of the dental



follicle, basal lamina, and morpho-cytological alterations of the enamel organ constituents. For example, from the onset of the intermediate bell stage to and including the late bell stage, the components of the outer enamel epithelium and stellate reticulum sustained morphological and cytological changes which preluded a change in the architectural appearance of the enamel organ. Two morphological features of the outer enamel epithelium and stellate reticulum which indicated a loss of contiguity were the shifting in cell position and the shortening and decrease in number of the cytoplasmic and microvillarlike processes. While Pannese (1961, 1964) described similar morphologic changes, he suggested that they were indicative of the onset of involution. He did not observe a disturbance in the intercellular attachment apparatus nor in the status of the tonoelements. This study demonstrated a progressive loosening of the junctional complexes from the outer enamel epithelium toward the stellate reticulum with a concomitant alteration in the tonofilament cytoskeleton which involved a dramatic reorganization. If one is to surmise that the shifting in cell position involves an alteration of the structural framework (the tonoelements) of the cell and simultaneous loosening of the contact zones, then one can expect these aforementioned cell components to be affected.

Another feature which indicated a relocation of the cells was the formation of an ectoplasmic layer. According to Fawcett (1966), the mobility of cells and the capacity of other cells to change actively the configuration of their surface depends upon the properties of a thin ectoplasmic zone im-

mediately subjacent to the plasmalemma. This ectoplasmic zone results from the accumulation of the organelles within the central portion of the cell.

Later, after nidus formation was completed, reorganization of the desmosomal connections occurred to conform to the newly acquired cell relationship. Simultaneously, the tonoelements, although reduced in caliber, appeared to be quantitatively increased and associated with the desmosomes, indicating a reorganization of the architectural framework. The disappearance of the ectoplasmic layer concomitant with the above observations marked the completion of cell reorientation. The reestablishment of the outer enamel epithelium and the stellate reticulum as viable cells enables one to speculate their role in forming a portion of the system of epithelial rests (James, 1909; Stanley, 1965; and Diab *et al.*, 1966).

Except for the denser accumulation of glycogen, these cell islands resembled the ultrastructural description given by Valderhaug and Nylen (1966) to the "epithelial rests of Malassez." They have concluded from their observations that the cell rests were viably quiescent epithelial cells capable of meeting the functional demands exacted of them. They have clearly demonstrated that these cells have nothing in common with secretory cells.

Pannese (1961), in describing the final stage of involution of the stellate reticulum, also noted an increase in irregularly arranged tonoelements. Kaltenbach (1966) suggested that the system of tonofibrils, observed in the papillary layer of the developing rat incisor, functioned by protecting this layer from mechanical stresses occur-



ring during enamel maturation. They also might play a major role in preserving the complex architecture of the cell bodies and their processes.

Another important feature in the island or peninsula formation of the outer epithelium and stellate reticulum was the presence of the uninterrupted basal lamina which maintained a constant barrier between the epithelial cells and the components of the dental sac. As the cells reoriented themselves and continued to form the cell nidi, the basal lamina was observed to remain closely adherent to the cell surfaces. Valderhaug and Nylen (1966) also observed a basal lamina surrounding the epithelial rests from the periodontal ligament.

All cells of the outer enamel epithelium and stellate reticulum do not participate in epithelial (rest) island formation. However, all cells do exhibit certain retrograde cytologic changes. These include clefting of the nucleus, condensation of chromatin material, myelin figure formation and reduction of the organelles. Of the changes observed in this study, Pannese (1961 and 1964) and Kallenbach (1966) noted only myelin figure formation. Pannese (1961 and 1964) did report, however, involutional changes in the cells involving a decrease in organelles with a commensurate increase in tonoelements. This process progresses to a point at which these cells are replete with tonofilaments. The human material does not experience the activity described by Pannese (1961) for feline and ox enamel components. Rather, it was noted that cells involved in epithelial rest formation remained in an arrested stage of degeneration and often recuperated. Those which did not par-

ticipate in island formation appeared to degenerate completely. Complete degeneration, however, was marked by the disappearance of all organelles, vacuolization of the cytoplasm and budding off of cell portions. The latter eventually were observed as empty membraned structures of varying size located in the intercellular spaces. Lysosome-like bodies were found throughout all cell strata during the intermediate and late bell stage. If the function of the lysosomes can be related to the hydrolytic nature of the enzymes which they contain, then, it would be expected that they be present in cells undergoing degenerative or involutionary changes. Smith and Farquhar (1966) have postulated a pathway for lysosome formation in cells of the anterior pituitary gland of rodents at a time when these cells are experiencing pronounced cellular involution. Although the lysosome bodies were not found in sufficient numbers in this study to account for the complete destruction of some of the cells or their extensions, there can be little doubt that they provide a mechanism which is partially responsible for cell destruction.

Several interesting observations in the present study involved the glycogen, endoplasmic reticulum, and the glycocalyx.

Glycogen deposits which were found in all cells of the enamel organ in all stages of morpho-histodifferentiation were similar to those described by Drochmans (1960), Revel, Napolitano and Fawcett (1962) and Revel (1964) in that they were observed as single (beta) units and rosettes (alpha) particles. In the present study the glycogen deposits in the cells were unimpressive in the early bell stage, great-



est in the intermediate stage and reduced in the late bell stage. It was interesting to note that the intracellular glycogen accumulations in the intermediate stage coincided with the disappearance of the surface coating of mucopolysaccharide and with an increase in the quantitative status of the endoplasmic reticulum. It has been demonstrated by Burgos (1960) that the mucopolysaccharide surface coating gains entrance into the cells of *ductuli efferentes testis* and those of the kidney proximal convoluted tubules by pinocytotic vesicles. It is also possible that cells are capable of producing an enzyme, mucopolysaccharidase, which hydrolyzes the external covering. The metabolic products (glucose and uronic acid) could be absorbed by the cell by active transport mechanisms and reconverted into glycogen. If one were to equate the dimensional aspects of the glycocalyx with the amount of glycogen in the cells in the intermediate stage, it immediately becomes apparent that some other source for glycogen production must be present. Carasso (1960), working with the paraboloid of the turtle eye presented evidence that glycogen synthesis occurs *via* activity of the elements of the rough surface endoplasmic reticulum. Biochemical substantiation of this phenomenon was effected by Robbins, Traut and Lipmann (1959). Correlating the increased amounts of glycogen in the cells of the present study with a hypertrophy of the ergastoplasmic elements in the cells, one is tempted to conclude that the quantitative status of glycogen is a product of two sources extracellularly by way of the glycocalyx and intracellularly *via* the endoplasmic reticulum.

The decreased amount of glycogen in the late bell stage is possibly related to three cytological features of the cells in this period of development. It is postulated that some of the glycogen is used by the cell in its oxidative function similar to that described by Palade and Schidlowsky (1958) for pancreas and liver cells. Further, since there appears to be an increase in the lipid content during the period of glycogen diminution, it is entirely possible as demonstrated by Palade and Schidlowsky (1958) that there is a shift from carbohydrate to active lipid synthesis and that this material is stored for subsequent oxidation. The third mechanism involved in glycogen reduction is the extrusion of glycogen as membrane bound masses into the intercellular spaces. Whatever the mechanism for the appearance of glycogen in the intermediate and its disappearance in the late bell stage may be, there can be little doubt that at any given moment cells near the summit of the enamel organ will have developed further than those near the cervical loop. It is evident, then, that in the course of normal development, cells of the outer enamel epithelium at the summit may be in the intermediate bell stage, and therefore, contain large amounts of glycogen, while cells toward the cervical loop which are in an early bell stage will not contain glycogen. The present study rejects the hypothesis proposed by Trott (1967) which suggests that a decrease in glycogen content of the cells from the summit of the outer enamel epithelium to the cervical loop is a product of migration of the dental lamina components. It is unfortunate that this hypothesis was based on histochemical



study and not correlated with electron microscopic evidence, especially since this study and others in this laboratory have demonstrated that the remnants of the enamel organ, parent lamina and differentiating enamel epithelium are unquestionably morphologically and cytologically dissimilar (Fischlschweiger, Provenza and Sisca, 1967).

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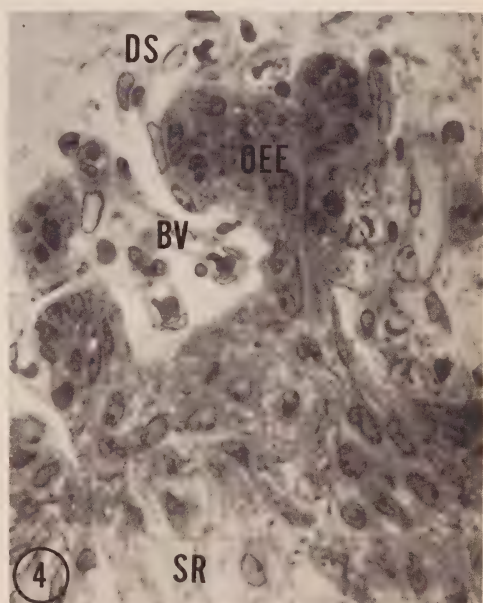
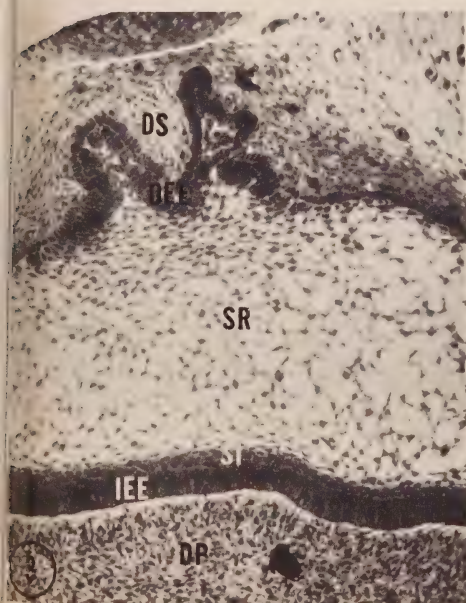
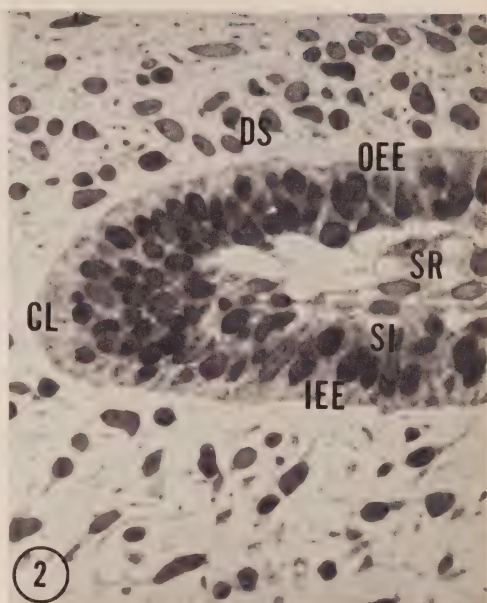
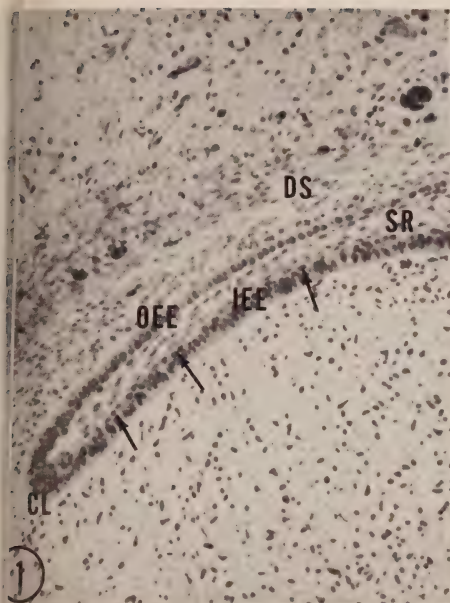
- Fig. 1. Optical micrograph of human tooth in the early bell stage. Outer enamel epithelium (OEE) consisting of cuboidal shaped cells are separated from the inner enamel epithelium (IEE) by cells of the stellate reticulum (SR) and stratum intermedium (arrows). Note that the fibroblasts in the dental sac (DS) are in close proximity to the outer enamel epithelium. The cervical loop (CL) exhibits an increase in cell number. x 360

- Fig. 2. Cervical loop area (CL) of Figure 1 at higher magnification. Note the outer enamel epithelium (OEE) at this site becomes several layers thick probably to provide for growth of the enamel organ. Outer enamel epithelium (OEE) and inner enamel epithelium (IEE) are separated by stellate reticulum (SR) and stratum intermedium (SI) cells x 1,344

- Fig. 3. Optical micrograph of human enamel organ in intermediate bell stage of development. Note the outer enamel epithelium (OEE) is thrown into folds and appears multilayered in certain areas. Cells of the stellate reticulum (SR) underlying these folds are somewhat condensed. Remaining cell layers of the enamel organ such as inner enamel epithelium (IEE) and stratum intermedium (SI) do not exhibit alterations in cell arrangement. Dental sac (DS), Dental papilla (DP). x 288

- Fig. 4. Light micrograph of human tooth at the beginning of late bell stage. Closely packed outer enamel epithelial cells (OEE) are shown anticipating cluster formation. Stellate reticulum cells (SR) appear to participate in this cluster development. Dental sac components (DS) and blood vessels (BV) are moving toward the stellate reticulum. x 1,150







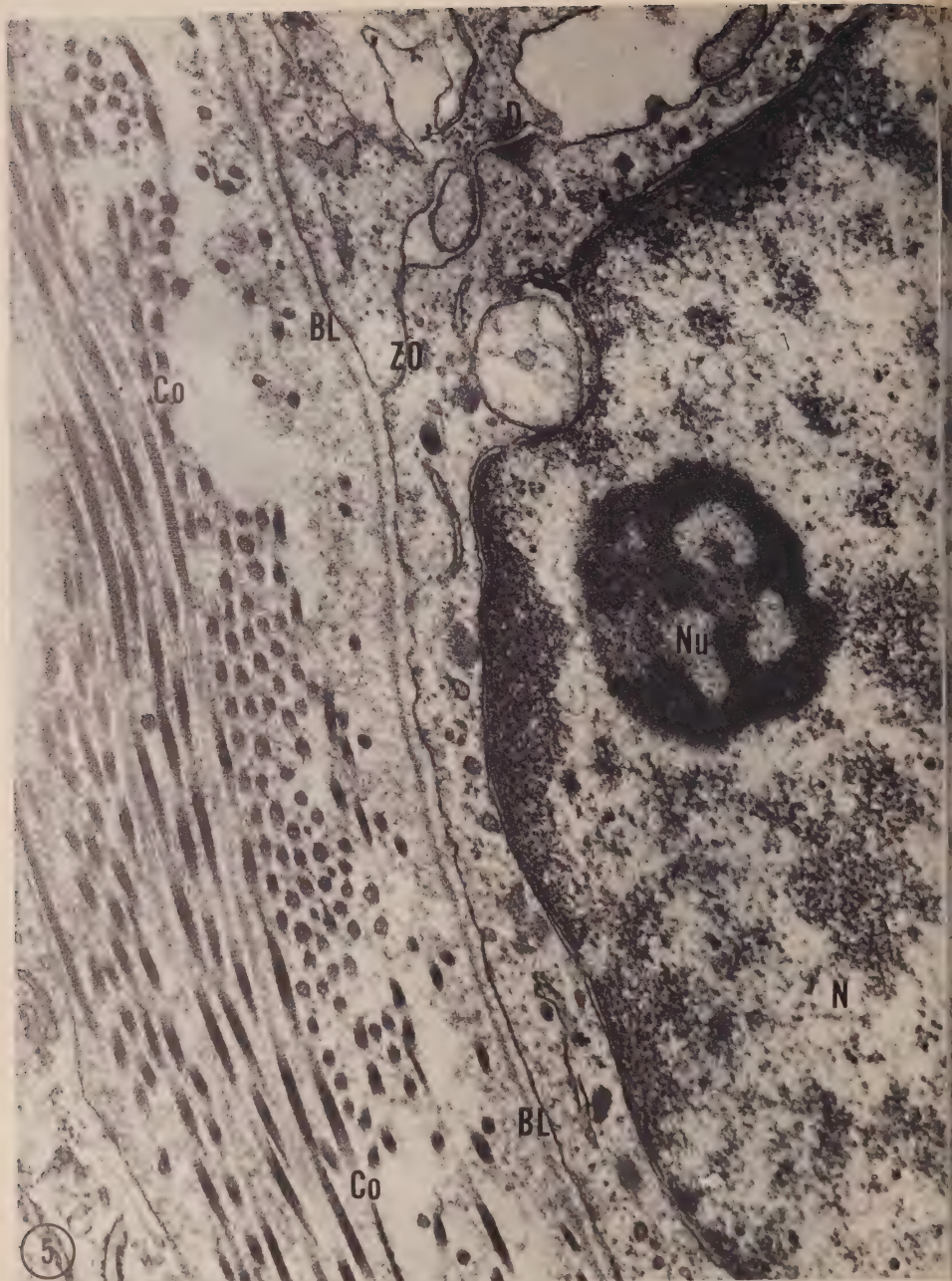


Fig. 5. Electron micrograph of outer enamel epithelial cells in the early bell stage. Cell contacts are made by desmosomes (D) and tight junctions (ZO). Nuclei (N) demonstrate even distribution of chromatin. A basal lamina (BL) surrounding the developing tooth bud separates the outer enamel epithelial cells from the dental sac. Nucleolus (Nu), collagenous fibrils (Co.) x 48,000



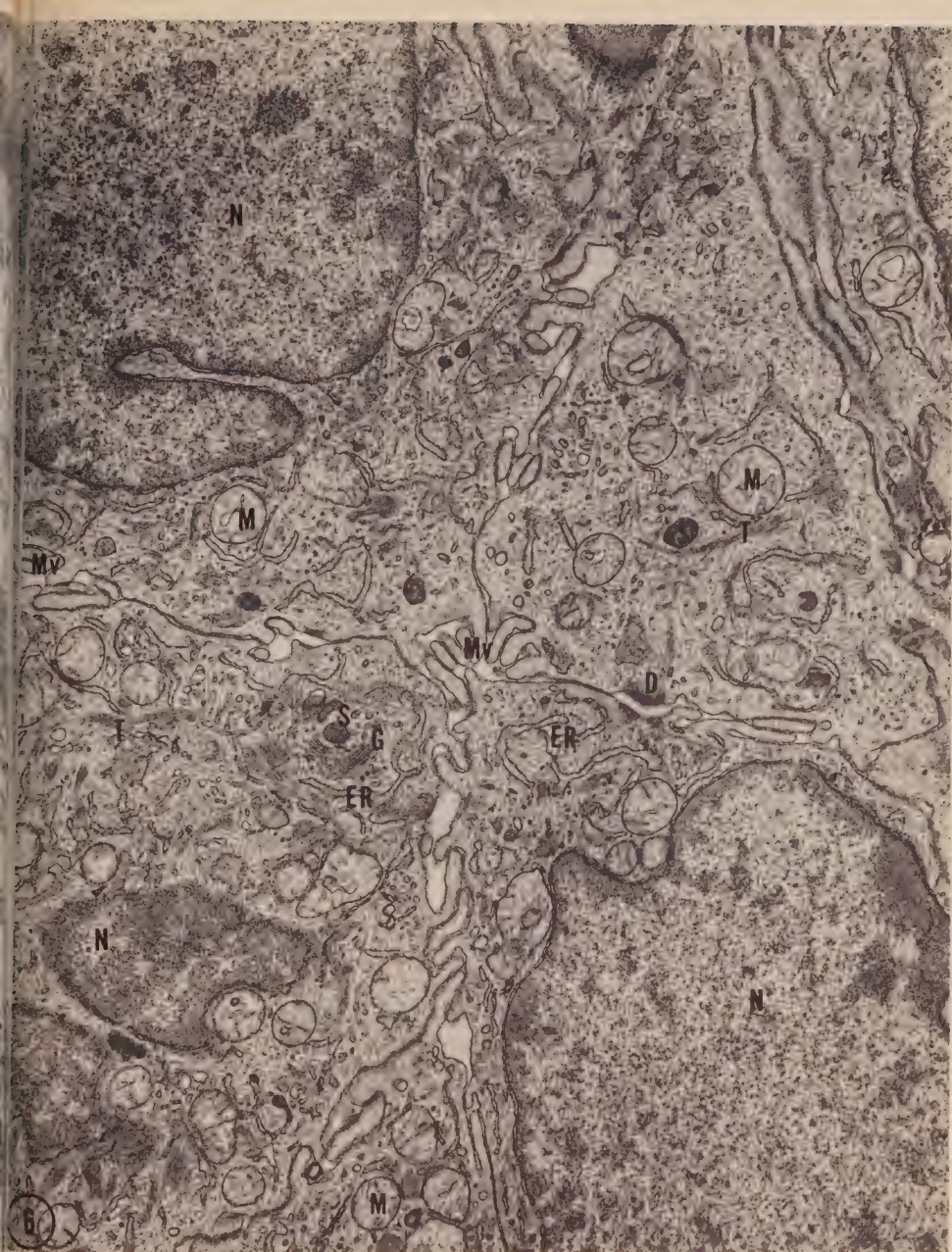


Fig. 6. Electron micrograph of outer enamel epithelium. Outer enamel epithelial cells at the beginning of the intermediate bell stage. Note small intercellular spaces containing microvillarlike processes (Mv). The intercellular space at desmosomes (D) is widened. Cells exhibit normal complement of organelles such as nuclei (N), mitochondria (M), endoplasmic reticulum (ER) and Golgi complex (G). Tonofilaments (T) and secretion granules (S) are present. x 21,000



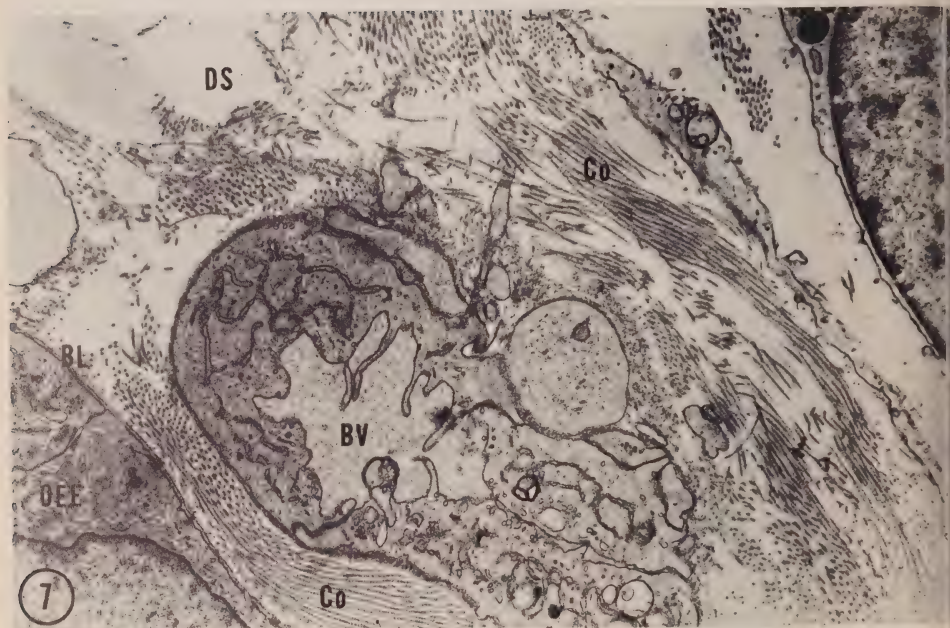


Fig. 7. Electron micrograph of dental sac. Mesenchymal cells which appear in the dental sac (DS) during the intermediate bell stage develop into blood vessels (BV). The enamel organ is represented here by outer enamel epithelial cells (OEE) and is separated from the dental sac by a basal lamina (BL). Bundles of collagenous fibrils (Co) in the dental sac are shown. x 12,000



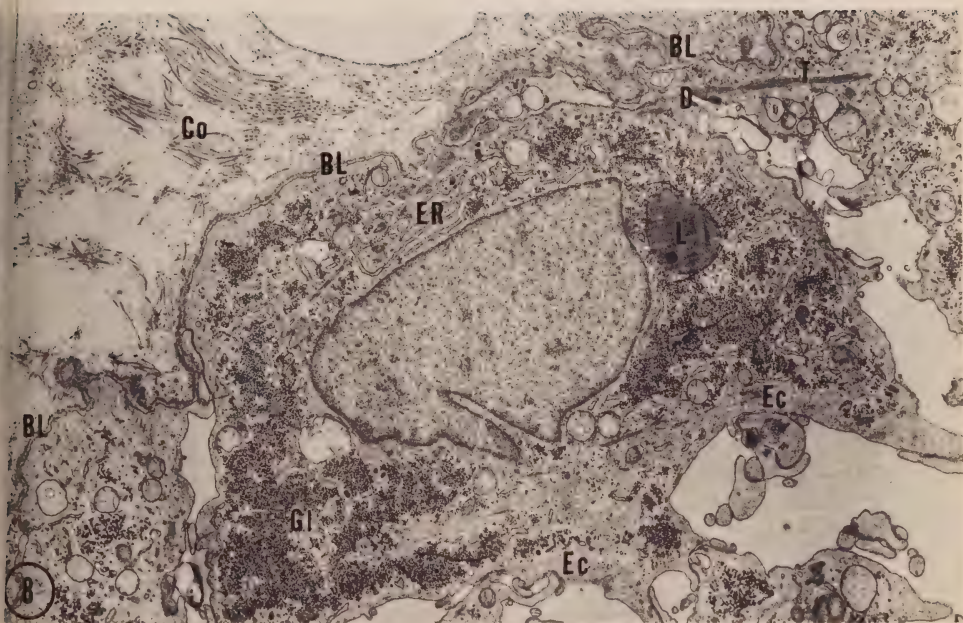


Fig. 8. Electron micrograph of dental sac and outer enamel epithelial cells. With continued development of the enamel organ in the intermediate bell stage, the cells of the outer enamel epithelium accumulate glycogen (GI) and lipid (L) and show a marked increase in endoplasmic reticulum (ER). Ectoplasmic zones (Ec) appear and cellular movements apparently result in a widening of intercellular gaps at desmosomes (D). Note irregular contour of the basal lamina (BL) which surrounds the enamel organ. Collagenous fibrils (Co) and tonofibrils (T).

x 10,000



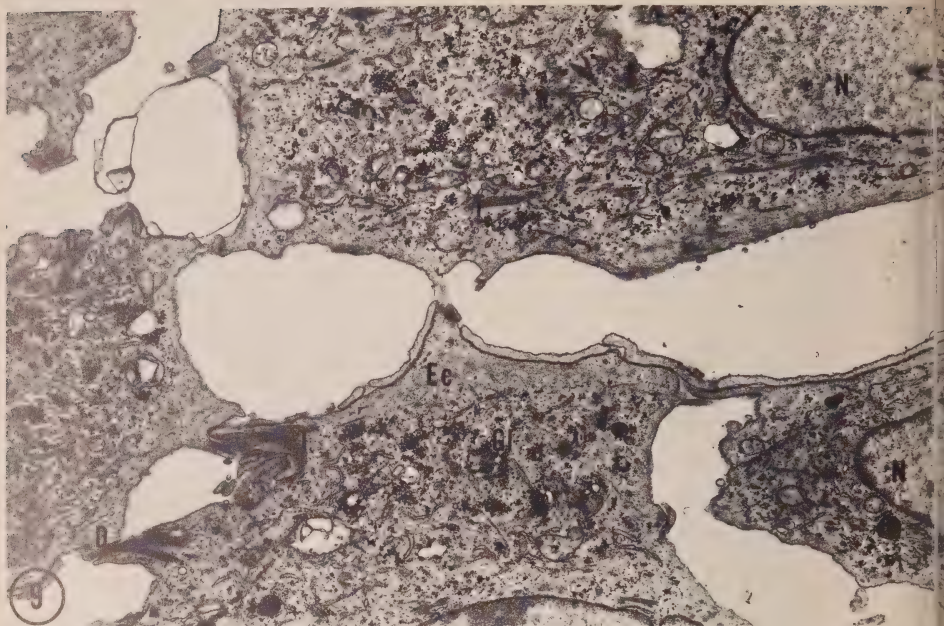


Fig. 9. Electron micrograph of stellate reticulum cells adjacent to outer enamel epithelial cells in the intermediate bell stage. The developmental path of these cells is similar to that of the outer enamel epithelium. Glycogen (Gl), ectoplasmic zones (Ec), desmosomes (D), tonoelements (T) and nucleus (N).  $\times 10,000$

Fig. 10. Electron micrograph of the outer enamel epithelium cells at the height of the intermediate bell stage. Most cells are rather irregular in shape with large intercellular spaces. Some cells are at their peak of glycogen accumulation (Gl). The latter are often associated with mitochondria (M), vacuoles (V) and endoplasmic reticulum. Note membrane bound glycogen in the intercellular spaces. Endoplasmic reticulum (ER) as well as ectoplasmic zones (Ec) are in evidence. Collagenous fibrils (Co), Nucleus (N), Nucleolus (Nu).  $\times 13,500$







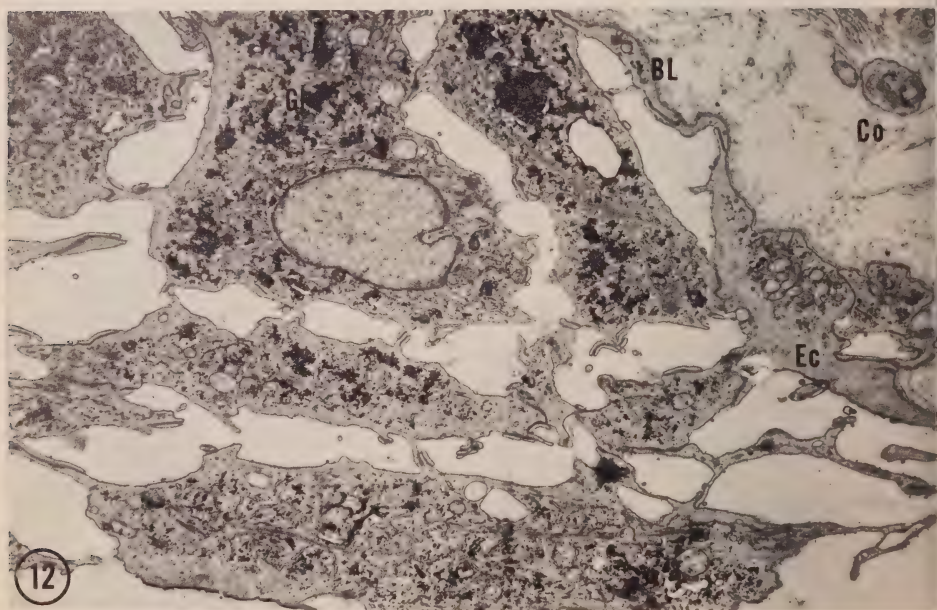
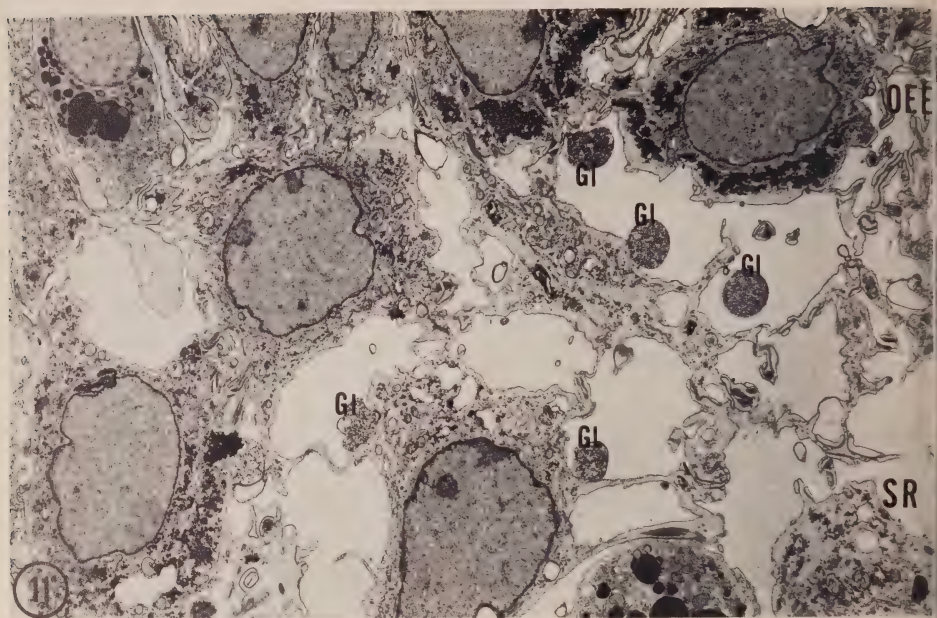




Fig. 11. Electron micrograph of stellate reticulum cells (SR) are somewhat retarded in their development compared to cells of the outer enamel epithelium (OEE). Note differences in glycogen accumulation and glycogen (Gl) in membrane bound vesicles in intercellular spaces. x 5,000

Fig. 12. Electron micrograph of cell diffuse area. With the initiation of cluster formation local areas appear to becoming thinner and thinner with the result that the outer enamel epithelium consists of a few cellular processes only. Glycogen (Gl) is still present in large amounts in the cells but many of the processes are almost completely devoid of organelles and exhibit large ectoplasmic zones (Ec). A basal lamina (BL) surrounds the enamel organ. Collagenous fibrils (Co) are seen in the dental sac. x 8,000

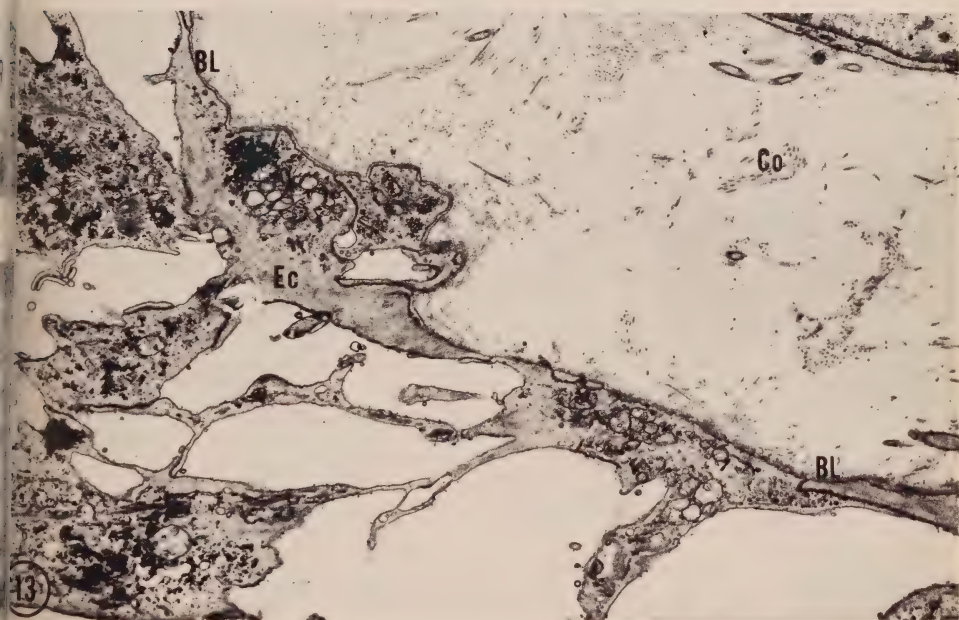


Fig. 13. Part of Figure 12 at slightly higher magnification. The basal lamina (BL) overlying a few outer enamel epithelial cell processes forms a continuous layer. Collagenous fibrils (Co) and Ectoplasm (Ec) x 10,000



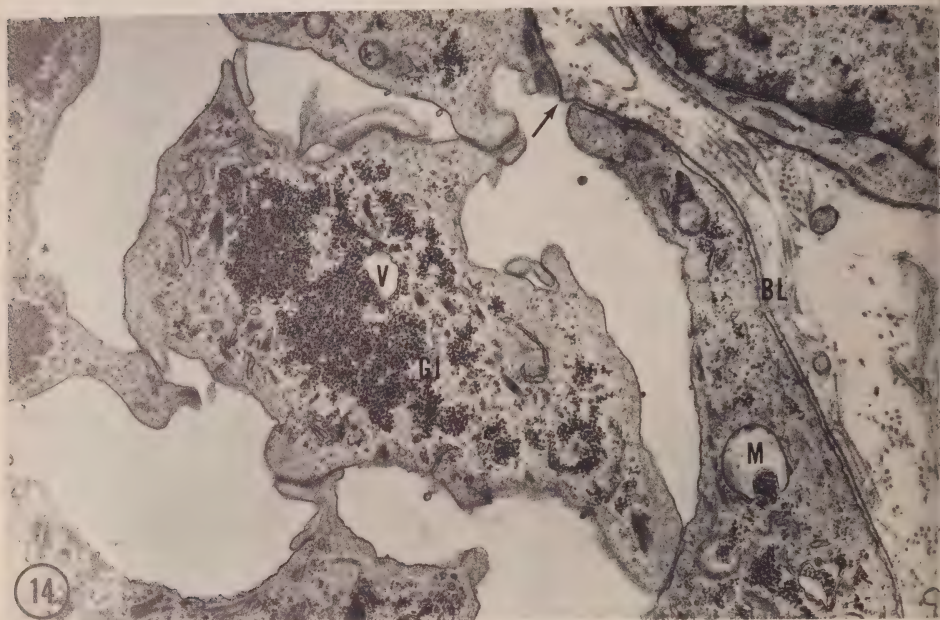


Fig. 14. The intercellular continuity of the outer enamel epithelium is lost in certain areas in the intermediate bell stage. It is at these sites that the basal lamina (BL) is relocated into and through the outer enamel epithelium (arrow). Glycogen (Gl) which remains present in many of the outer enamel epithelial cells is associated with vacuoles (V) and mitochondria (M). x 14,000

Fig. 15. Electron micrograph of cell cluster formation in the outer enamel epithelium (OEE). Dental sac material (DS) migrates through the gaps between these developing clusters. Fingerlike projections of the basal lamina (arrows) can be observed between outer enamel epithelial cells and between reticulum cells (SR). Ectoplasmic zones (Ec) are evident in outer enamel epithelial and stellate reticulum cells. Some stellate reticulum cells which are in a belated period of development contain glycogen accumulations (Gl). Nucleus (N), tonofibrils (T). x 7,750



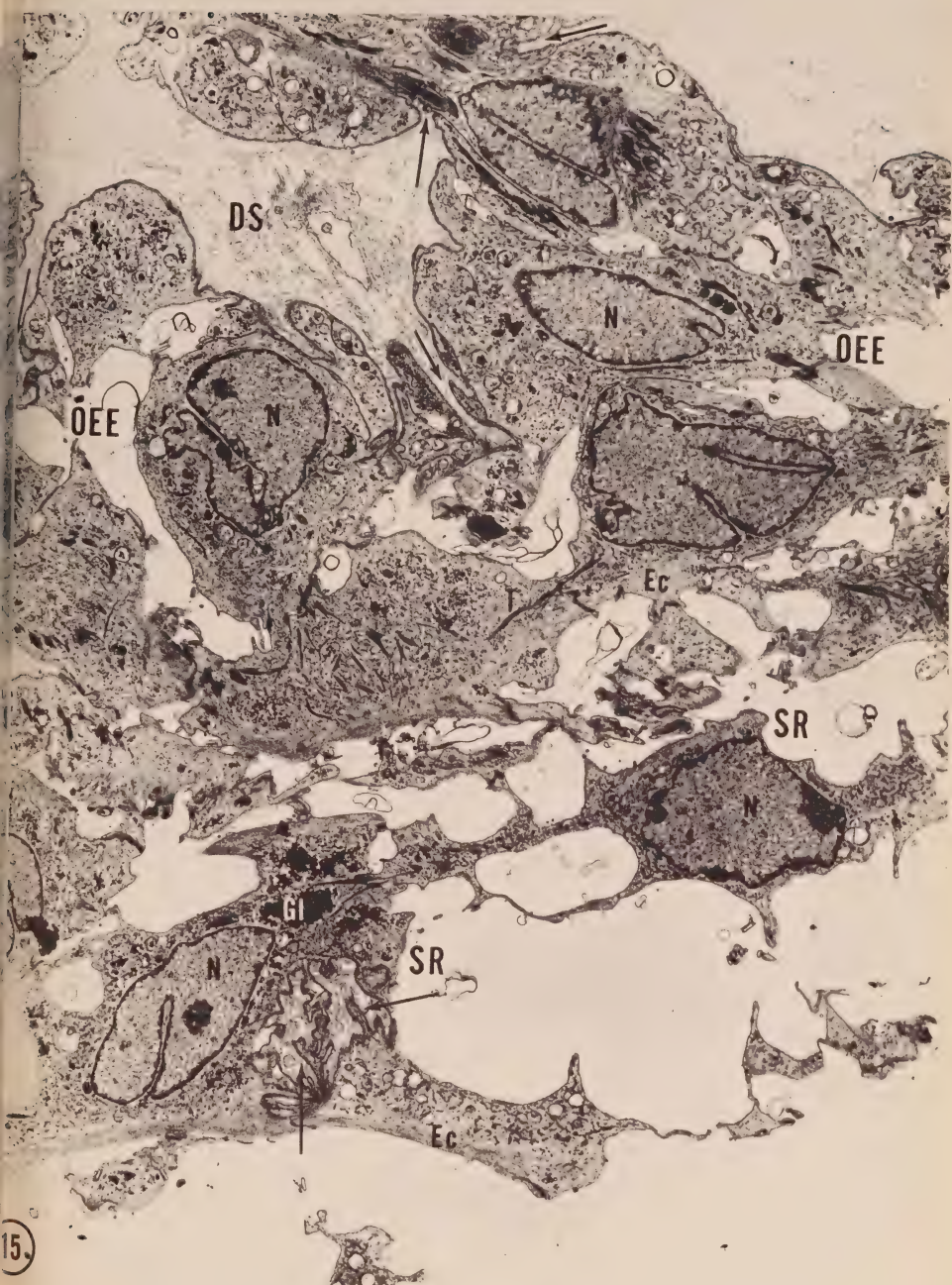






Fig. 16. Electron micrograph of cell clusters of the outer enamel epithelium (OEE) in the late bell stage. Dental sac material (DS) is observed between these clusters. Large blood vessels (BV) are a prominent feature at this stage of development. x 6,750



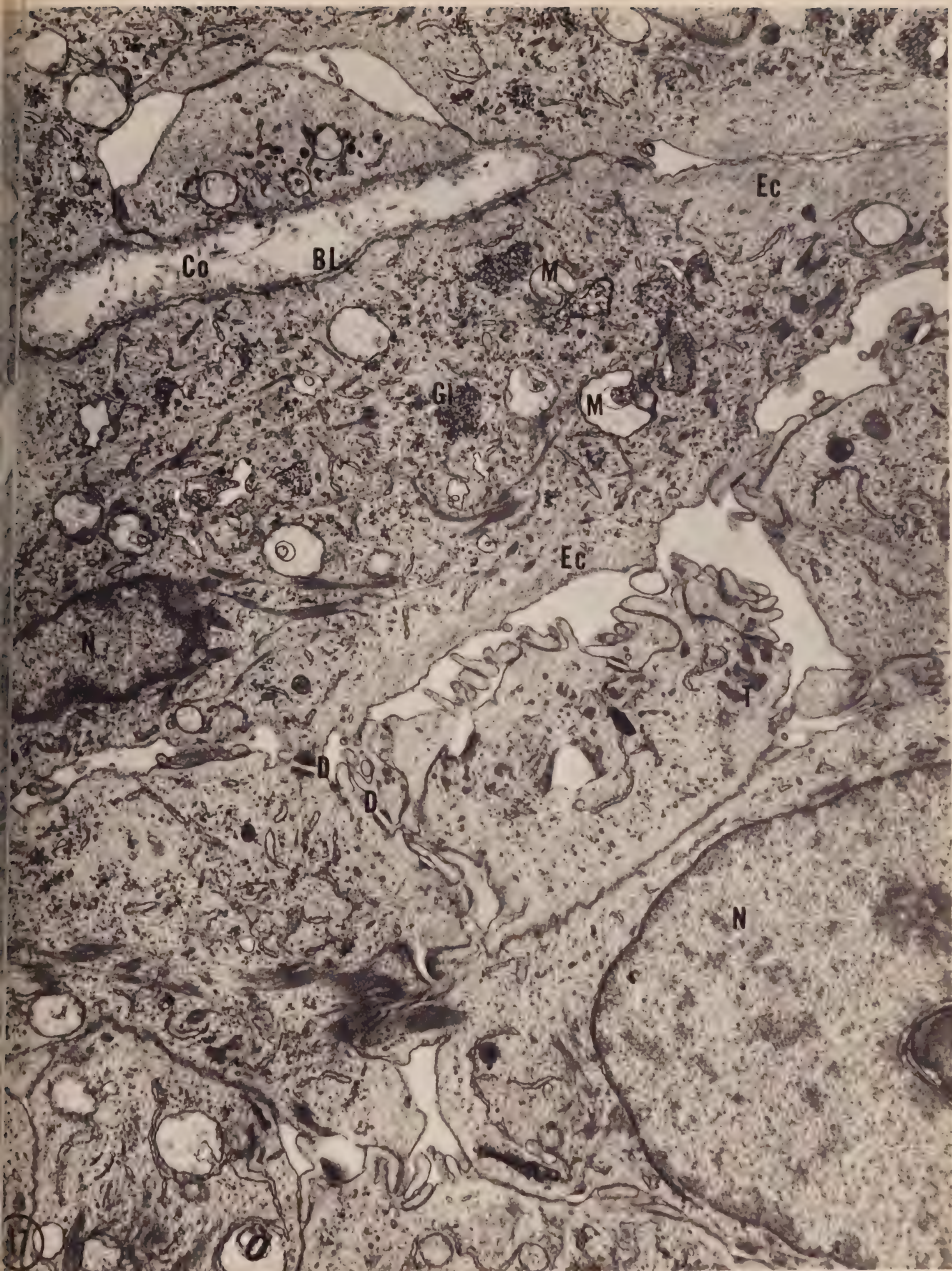


Fig. 17. Electron micrograph of outer enamel epithelial cells in the late bell stage. Portions of the basal lamina (BL) and collagenous fibrils (Co) of dental sac can be seen between outer enamel epithelial cells. Intercellular connections are becoming re-established *via* desmosomes (D). Large portions of ectoplasm (Ec) persist. Note horseshoe shaped mitochondria (M) which may be associated with glycogen accumulation (Gl), Nucleus (N).  
x 21,000



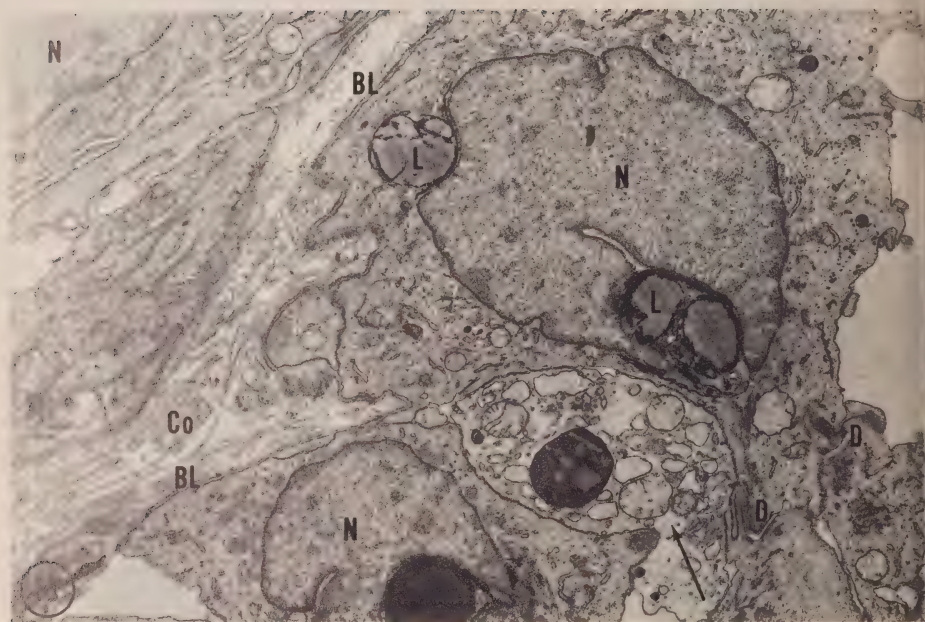


Fig. 18. Electron micrograph of the outer enamel epithelium cells in the late bell stage. Lipid bodies (L) in perinuclear regions can be seen. Some cells appear to undergo complete degeneration (arrow). Basal lamina (BL), collagenous fibrils (Co), Nucleus (N) and desmosomes (D).  
x 10,000



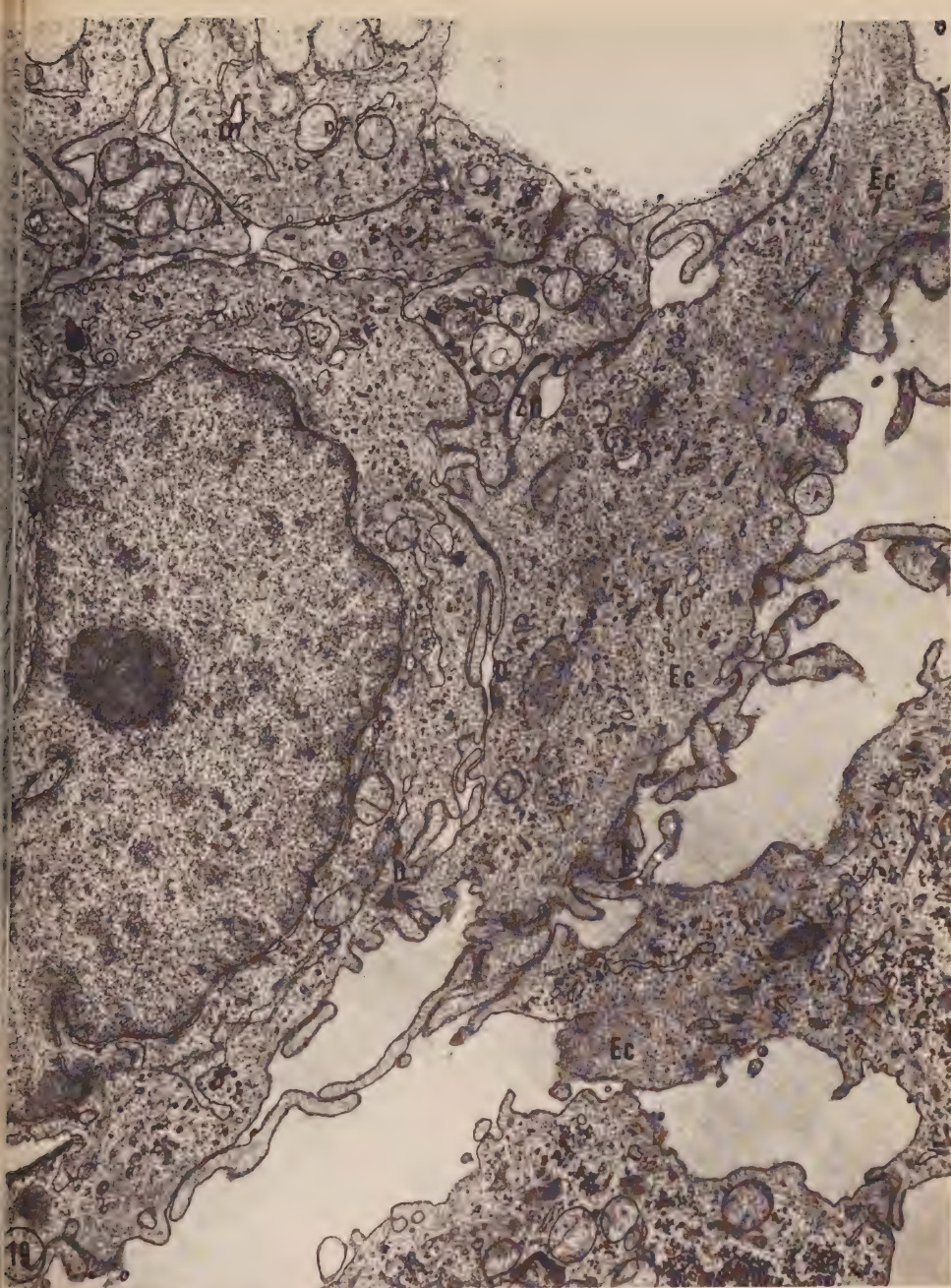


Fig. 19. Electron micrograph of outer enamel epithelial cells in process of recuperation. Intercellular connection desmosomes (D) and tight junctions (ZO) have been re-established. Ectoplasmic zones (Ec) are of reduced width and are of local occurrence.

x 21,000



# Differential Growth Patterns Of Transformed Cells

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**SUMMARY**—Transformation of a strain of *Bacillus subtilis* requiring both leucine and tryptophan for growth resulted in two types of transformants. One transformant required only leucine and the other only tryptophan. The growth pattern of the original strain was compared to the two transformants derived

from it both immediately following transformation and after three transfers on nutrient agar. The transformants showed reduced growth patterns immediately after transformation. Following three transfers the growth rate was similar to the original strain.

## INTRODUCTION

Bacterial transformation is the process by which a fraction of donor cell's extracted or naturally released extracellular deoxyribonucleic acid (DNA) penetrates a closely related cell where it replaces, by recombination, a specific part of the recipient's genome. When the fraction of the genome replaced in the recipient cell differs from the free DNA derived from the donor, a new characteristic may be transferred. The recipient is then said to be transformed.

Transformation was first observed by Griffith (1928) when he detected that living smooth cells of *Diplococcus pneumoniae* could be isolated from a mouse which had been injected simultaneously with heat-killed smooth cells and rough cells of this organism. Smooth and rough pertain to the appearance of the colonies of these organisms on agar and it is known that their appearance is correlated with pathogenicity, the smooth cells being virulent and the rough avirulent. Something had passed from the dead smooth cells into the rough cells transforming them into virulent, smooth type.

Dawson and Sia (1931) showed that this transformation could occur *in vitro* under certain rigid physiological conditions. Alloway (1932) succeeded in showing this phenomenon with a cell free soluble extract derived from the smooth cells and introduced into a solution with the rough cells.

The cellular component responsible for transformation of one type of *D. pneumoniae* to another remained unidentified until Avery, MacLeod, and McCarty (1944) discovered that the transforming factor was DNA. Employing various chemical, enzymatic, and serological techniques they gave the first direct evidence that it was DNA that was the genetically active substance and thus of great significance in heredity.

To discuss the findings of the various investigators, it is desirable to explain the terminology used. Mutant strains of bacteria which require growth factors not required by the parent, "wild-type," strain are called auxotrophs. The growth factors required by the auxotroph are designated

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in the following manner: the needed growth factor is shown by the superscript (-) indicating that the gene concerned in its synthesis is missing. The presence of the gene (*i.e.*, the lack of an exogenous requirement) is denoted by the superscript (+). Thus, a parent strain may be  $\text{leu}^+\text{try}^+$  and an auxotroph derived from it and requiring leucine would be  $\text{leu}^-\text{try}^+$ .

Transformation was discovered in *Bacillus subtilis* by Spizizen (1958). He transformed an indole requiring strain ( $\text{ind}^-$ ) to indole independency with as little as  $2 \times 10^{-3}$   $\mu\text{g/ml}$  DNA. Anagnostopoulos and Spizizen (1961) determined optimal physiological conditions for *B. subtilis* transformation. Young, Spizizen, and Crawford (1963) attempted to relate alterations in cell wall composition with the ability of different strains of *B. subtilis* to be transformed. Barnhart and Herriott (1963) demonstrated that the DNA is bound to the cell wall for a short time before entering and Strauss (1965) showed that the DNA enters the recipient cell in a linear fashion.

Studies were undertaken to determine if the recipient's genome might in any way be altered after DNA integration, aside from just the replacement of the segment under investigation. Although there must be rearrangements in the genome at the site of leucine utilization for a  $\text{leu}^-$  organism to become  $\text{leu}^+$ , there may be additional alterations or replacements at other sites which would upset the normal metabolism of the cell. A comparison was made among the growth patterns of different strains of *B. subtilis* which required either both leucine and tryptophan for growth or which required only one of the two amino acids.

The strains which required only one amino acid were derived from the doubly-requiring strain by transformation. Growth studies on the transformed cells were performed both immediately following transformation and after three transfers on nutrient agar.

## MATERIALS AND METHODS

### Organisms

The wild-type organism, *Bacillus subtilis* strain 23, was obtained from Dr. J. Spizizen, University of Minnesota, Minneapolis. *B. subtilis* strain 168 requiring leucine and tryptophan was obtained from Dr. J. Marmur, Yeshiva University, New York. Organisms requiring only one of the amino acids were derived by the author by transformation from *B. subtilis* strain 168 using the techniques described below.

### Media

Minimal medium for the following studies was composed of salts and glucose in the following concentrations: ammonium sulfate, 0.2%; dipotassium sulfate, 1.4%; monopotassium sulfate, 0.6%; sodium citrate  $\cdot 2 \text{H}_2\text{O}$ , 0.1%; magnesium sulfate  $\cdot 7 \text{H}_2\text{O}$ , 0.02%; glucose was added to a final concentration of 0.5% after autoclaving separately. The following variations were used:

- 1.) minimal-yeast extract-lactate medium, minimal medium to which was added yeast extract (0.25%) and sodium lactate (1.5%);
- 2.) M-1, minimal medium to which was added 50  $\mu\text{g/ml}$  tryptophan, 50  $\mu\text{g/ml}$  leucine and casein acid hydrolyzate (0.02%);



- 3.) M-2, minimal medium to which was added 5  $\mu\text{g}/\text{ml}$  tryptophan, 5  $\mu\text{g}/\text{ml}$  leucine and casein acid hydrolyzate (0.01%).

Medium for the assay of double transformants consisted of minimal-agar (minimal medium plus 1.5% Difco agar). Media for the assay of single transformants consisted of minimal-agar plus 50  $\mu\text{g}/\text{ml}$  of either leucine or tryptophan. The total number of cells exposed to DNA was determined on plates containing minimal-agar plus 50  $\mu\text{g}/\text{ml}$  leucine and 50  $\mu\text{g}/\text{ml}$  tryptophan.

Media for growth studies consisted of liquid minimal medium with the following additions: for *B. subtilis* (leu<sup>-</sup>try<sup>-</sup>) growth studies from 0-12 hours, 75  $\mu\text{g}/\text{ml}$  tryptophan and 75  $\mu\text{g}/\text{ml}$  leucine; for comparative growth studies at five and nine hours, either 75  $\mu\text{g}/\text{ml}$  leucine with varying concentrations from 0-75  $\mu\text{g}/\text{ml}$  tryptophan, or 75  $\mu\text{g}/\text{ml}$  tryptophan with varying concentrations from 0-75  $\mu\text{g}/\text{ml}$  leucine. For the transformants (leu<sup>-</sup>try<sup>+</sup>) and (leu<sup>+</sup>try<sup>-</sup>), addition of the amino acid required for growth was identical to that noted above, i.e., 75  $\mu\text{g}/\text{ml}$  amino acid was added for the growth study from 0-12 hours, and varying concentrations from 0-75  $\mu\text{g}/\text{ml}$  for comparative studies at five and nine hours.

Stock cultures and transfers of all organisms were maintained on tryptose blood agar base slants (Difco).

#### *Extraction of Deoxyribonucleic Acid*

Extraction of deoxyribonucleic acid was carried out by a modification of the method of Anagnostopoulos and Spizizen (1961). DNA was isolated from *B. subtilis* strain 23. The cells were grown for 15 hours at 35-39° C in flasks on a wrist-action shaker in mini-

mal-yeast extract-lactate medium. The suspension was centrifuged at 4500 rev/min at room temperature and the sediment then diluted twenty-fold in a 20% sucrose, 0.1 M sodium chloride, and 0.05M sodium citrate solution. This suspension was incubated in a 37° C water bath with shaking for 15 minutes and lysozyme (crystalline, egg-white, Sigma) added to give a final concentration of 50  $\mu\text{g}/\text{ml}$ . Conversion of the cells to protoplasts, after incubation at 37° C, was noted by an increase in viscosity of the solution following a second addition of lysozyme to a concentration of 50  $\mu\text{g}/\text{ml}$ .

The protoplasts were centrifuged at 4500 rev/min for 30 minutes at room temperature. The sediment was suspended in 1/20th its original volume of cold 0.1 M sodium chloride solution containing 0.05 M sodium citrate. After shaking gently for ten minutes to break up the clumps of protoplasts, the suspension was centrifuged at 4500 rev/min for 30 minutes. The sediment was suspended in the original volume of cold 2 M sodium chloride and stirred for 1 hour in an ice bath. Following another centrifugation under the same conditions as before, the supernatant fluid was saved for the subsequent precipitation of DNA. The sediment was extracted a total of four times.

One volume of the supernatant fluid from the 2 M sodium chloride extracts was slowly added to twice its volume of cold 95% ethanol. Fibers of DNA-protein appeared and were removed from solution with bent glass rods. They were transferred to 20 ml of 2 M sodium chloride solution which dissolved the DNA and some of the protein. Undissolved protein was removed by centrifugation after the solution



had been stored at 4° C for 15 hours. The supernatant was then incubated at 37° C and treated with 1 ml of 2% sodium deoxycholate solution. After 1 hour at this temperature it was placed at 4° C for 15 hours and then centrifuged to remove the released protein. After reprecipitation with 95% alcohol and resuspension in 2 M sodium chloride, the sodium deoxycholate treatment was repeated. Ribonucleic acid was then removed by the addition of 50 µg/ml ribonuclease (5 X crystallized Sigma) to a 2 M sodium chloride suspension of the DNA fibers at 37° C. The DNA fibers were again precipitated with alcohol and stored at 4° C in a 2 M sodium chloride solution.

#### *Cell Growth for Transformation*

*B. subtilis* strain 168 (leu<sup>-</sup>try<sup>-</sup>) was grown on a tryptose blood agar base slant for 15 hours at 37° C and inoculated into M-1 medium. The inoculum was at least  $1 \times 10^8$  cells/ml as determined by serial dilutions in sterile water followed by plating on nutrient agar. 2.5 ml aliquots of the M-1 suspension were pipetted into test tubes which were shaken on a wrist-action shaker for 4 hours at 35-39° C. The suspensions were centrifuged at 3500 rev/min for five minutes and the sediments diluted to 1/10th their volume with 1 ml of M-2 medium.

#### *Transformation Procedure*

Transformation was carried out by a modification of the method of Anagnostopoulos and Spizizen (1961). The M-2 suspensions from above were shaken at 35-39° C, and after 60 minutes the DNA extracted by the above technique was added to a final concen-

tration of 9 µg/ml. After a 15 minute exposure with continued shaking its transforming activity was terminated by the addition of 50 micrograms of deoxyribonuclease (1 X crystallized, Sigma).

The transformation mixture was diluted with 4 ml of minimal media and 0.1 ml aliquots were plated in triplicate on minimal agar plates with or without amino acids as described previously. Cells treated in a similar manner but without addition of DNA were used as a control and were also plated on the various media.

The number of cells transformed was determined by counting the colonies on the plates after 18 hours in cubation at 37° C.

#### *Procedure for Growth Studies*

The original transformable strain and the two strains derived from it by the author by transformation were grown in the media as described above. The media were inoculated with the organisms after 24 hours growth on tryptose blood agar slants both immediately following transformation and after three other transfers on these slants in the following manner: two ml of test medium were introduced into the tubes followed by gentle agitation for one minute. One ml was removed and added to a tube containing five ml of test medium followed by vigorous shaking on a wrist-action shaker for five minutes. These five ml were then added to 200 ml of test medium which had been incubated at 37° C and shaking continued for 30 minutes at 37° C. These steps were performed to insure equal distribution of the cells and to initiate growth. Five ml aliquots were



then removed and introduced into test tubes with a 16 mm inner diameter. These tubes were placed on a wrist-action shaker in racks and shaken at 150 strokes per minutes at 35-39° C.

After various intervals, three tubes were removed and the contents resuspended in Klett tubes for readings on a Klett-Summerson photometer with a blue filter. Three readings were taken at each interval and the results are given as the average of the three readings.

## RESULTS

*B. subtilis* strain 168 (leu<sup>-</sup>try<sup>-</sup>) and the two transformants derived from it (leu<sup>-</sup>try<sup>+</sup>) and (leu<sup>+</sup>try<sup>-</sup>), will grow in liquid minimal medium if the necessary amino acid(s) are employed. When 75 µg/ml leucine and 75 µg/ml tryptophan are added to minimal medium the growth curve given in Fig. 1 is representative of the leu<sup>-</sup>try<sup>-</sup> organism. For purposes of comparison, the percent increase in growth as measured by turbidity units between five and nine hours was used to indicate the growth patterns of the organisms under the various conditions employed. Under the conditions noted here for the leu<sup>-</sup>try<sup>-</sup> organism the increase in growth during this interval was 360%.

By keeping the concentration of one amino acid at 75 µg/ml and varying the concentration of the other from 0 to 75 µg/ml as noted under the figures, the results in Figs. 2 and 3 were observed. Turbidity readings for the various concentrations were taken at five and nine hours and it can be seen that when the leucine concentration was kept constant and the tryptophan concentration varied, there was an increase in growth of 370% at 75 µg/ml tryp-

tophan. When the tryptophan concentration was kept constant and the leucine concentration varied, there was an increase in growth of 376% at 75 µg/ml leucine.

The following studies were designed to determine if the incorporation of DNA in transformation which led to nutritional independence of one marker, in any way interfered with the normal growth pattern of the organism as demonstrated in Figs. 1 and 2. When the growth patterns of the cells transformed to require only one amino acid were determined both immediately following transformation and after three transfers on nutrient agar, the results of Figs. 4 through 7 were observed. By comparing the various growth patterns of the organisms employed, as shown in Table 1, it can be seen that the cells studied immediately after transformation did not reach the peak of growth of the leu<sup>-</sup>try<sup>-</sup> organism and did not show as high an increase in growth from five to nine hours as measured by turbidity readings. However, after three transfers the cells attained the near maximum growth shown by the initial studies on the leu<sup>-</sup>try<sup>-</sup> organism.

## DISCUSSION

The growth studies showed that the requirement for the amino acid needed for growth of the transformed cells immediately after transformation was greater than the organisms from which they were derived, and from the same organism after three transfers on suitable slants. After three transfers the cells demonstrated a growth rate equivalent to that of the cells from which they were derived. This could indicate



that the incorporation of foreign DNA into a cell, and the subsequent integration of it with its genome, leads to a reversible alteration of the recipient's metabolism. Although Schaeffer (1964) postulated the existence of a temporary triple-helix between the newly introduced single-stranded DNA segment and the recipient's double-stranded genome, at least in the area of recombination, this has not been proven. Even if a temporary triple-helix is established, it may be that more of the recipient's genome is affected than just the markers under investigation. Recombination may lead to other alterations which would affect the normal metabolism of the cell in regard to its growth patterns. And, since Young and Spizizen (1961) have shown that many different DNA fragments may enter the cell, not all of them carrying the marker(s) under investigation, it is possible that these have an effect on the physiological activities of the cell.

Transformation does not appear to be merely a simple replacement of one DNA segment with another. Other loci on the recipient's genome are very likely affected. However, any alteration which may result from transformation, other than the permanent one introduced by the DNA segment under investigation, appears to be only a temporary one. The transformed organisms are able to recover their normal growth patterns after a few transfers.

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TABLE I

A comparison of the growth patterns of the organisms employed in these studies. The indicated mutants of *Bacillus subtilis* were grown on minimal medium supplemented with the indicated concentrations of amino acids. When varied concentrations of amino acids were employed readings were taken at 75  $\mu\text{g}/\text{ml}$ .

| Figure | Mutant                               | MINIMAL MEDIUM PLUS         |                                | TURBIDITY READING |            |            |
|--------|--------------------------------------|-----------------------------|--------------------------------|-------------------|------------|------------|
|        |                                      | $\mu\text{g/ml}$<br>leucine | $\mu\text{g/ml}$<br>tryptophan | 5 hours           | 9 hours    | % increase |
| 1      | leu-try-                             | 75                          | 75                             | 68                | 245        | 360        |
| 2      | leu-try-                             | 75                          | 0-75                           | 65                | 239        | 370        |
| 3      | leu-try-                             | 0-75                        | 75                             | 72                | 271        | 376        |
| 4      | a.) leu-try+(BT)<br>b.) leu+try-(BT) | 75<br>0                     | 0<br>75                        | 20<br>17          | 61<br>52   | 300<br>306 |
| 5      | leu+try-(BT)                         | 0                           | 0-75                           | 18                | 54         | 300        |
| 6      | leu-try+(BT)                         | 0-75                        | 0                              | 25                | 68         | 272        |
| 7      | a.) leu-try+(AT)<br>b.) leu+try-(AT) | 75<br>0                     | 0<br>75                        | 48<br>30          | 174<br>105 | 363<br>350 |

BT, Before Transfers  
AT, After Transfers



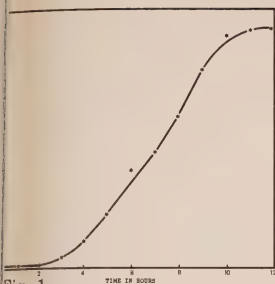


Fig. 1

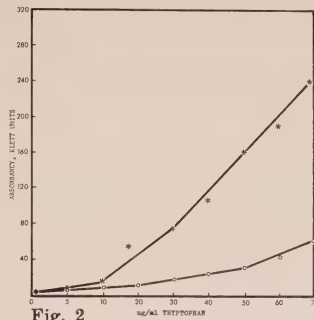


Fig. 2

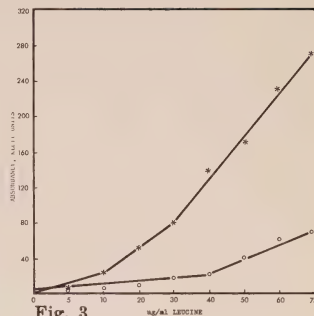


Fig. 3

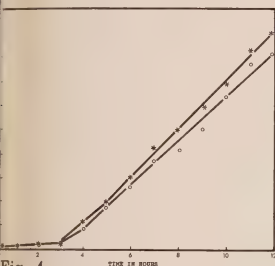


Fig. 4

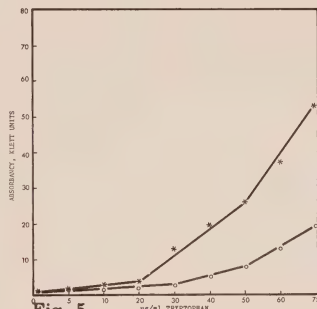


Fig. 5

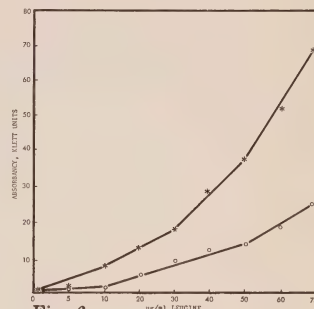


Fig. 6

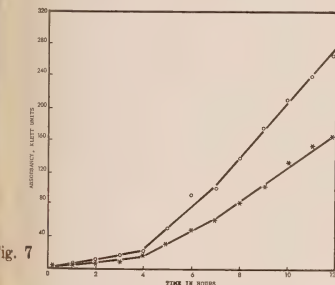


Fig. 7

## TIME IN HOURS

Fig. 1. *B. subtilis* (leu<sup>-</sup>try<sup>-</sup>) grown in minimal medium with 75 µg/ml leucine and 15 µg/ml tryptophan for 12 hours.

## µG/ML TRYPTOPHAN

Fig. 2. *B. subtilis* (leu<sup>-</sup>try<sup>-</sup>) grown in minimal medium with 5 µg/ml leucine and varying concentrations of tryptophan. Readings taken at five (o) and nine (\*) hours.

## µG/ML LEUCINE

Fig. 3. *B. subtilis* (leu<sup>-</sup>try<sup>-</sup>) grown in minimal medium with 75 µg/ml tryptophan plus indicated concentrations of leucine. Readings taken at five (o) and nine (\*) hours.

## TIME IN HOURS

Fig. 4. *B. subtilis* (leu<sup>-</sup>try<sup>+</sup>) (\*) and *B. subtilis* (leu<sup>+</sup>try<sup>-</sup>) (o) grown in minimal medium with 75 µg/ml required amino acid for 12 hours. Cells grown before transfers on slants.

## µG/ML TRYPTOPHAN

Fig. 5. *B. subtilis* (leu<sup>-</sup>try<sup>-</sup>) grown in minimal medium plus indicated concentrations of tryptophan. Cells grown before transfers on slants. Readings taken at five (o) and nine (\*) hours.

## µG/ML LEUCINE

Fig. 6. *B. subtilis* (leu<sup>-</sup>try<sup>+</sup>) grown in minimal medium plus indicated concentrations of leucine. Cells grown before transfers on slants. Readings taken at five (o) and nine (\*) hours.

## TIME IN HOURS

Fig. 7. *B. subtilis* (leu<sup>-</sup>try<sup>+</sup>) (o) and *B. subtilis* (leu<sup>+</sup>try<sup>-</sup>) (\*) grown in minimal medium with 75 µg/ml of the required amino acid. Cells grown after three transfers.



# Mercury / Alloy Ratio And Adaptability Of Dental Amalgam

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**SUMMARY**—Replication technique was employed to evaluate optically the effect of manipulation and mercury/alloy ratio of dental amalgam on its adaptability. Adaptability was appraised in terms of reproducibility of the abutting cavity walls by the amalgam surfaces. A higher mercury/alloy amalgam initiated with "wet" mix followed by "dry" increments produced best results. Amalgams

inserted with similar proportions of mercury produced inferior adaptation when all the increments were squeezed prior to insertion. A low mercury/alloy ratio technique yielded intermediate results. Varying roughness of the cavity walls produced by the different cutting instruments did not affect adaptability of the amalgams.

## INTRODUCTION

A prerequisite of an ideal filling material is adaptability. Adaptability of various restorative materials has been indirectly measured on the basis of penetration of dyes and fluids (Kakar, 1963; Leroy, 1933; Nelsen, Wolcott and Paffenbarger, 1952), bacteria (Mortensen, Boucher and Ryge, 1963; Volland, 1904; Webster, 1903) and isotopes (Armstrong and Simon, 1951; Cantwell, Claycomb and Gatewood, 1959; Crawford and Larson, 1956; Dute, Going and Massler, 1958; Going, 1959; Going, Massler and Dute, 1960; Phillips Gilmore, Swartz and Schenker, 1961; Swartz and Phillips, 1961; Taylor, Stowell, Murphy and Wainwright, 1959; Wainwright, Taylor, Marlis and Villanyl, 1957; Wainwright, Stowell and Taylor, 1959; Yen, 1963) into the interfaces of the restoration and cavity wall. One such study indicated that ingress of radioisotopes was diminished when rough surfaced cavity walls were selected for restorations (Menegale,

Swartz and Phillips, 1960). In another study adaptability of amalgam was visually valuated in terms of interface profile (Charbeneau and Peyton, 1958). A direct visual examination of amalgam adaptation was presented by comparing the amalgam blocks condensed against scratched steel surfaces and by micromasurements of amalgam surfaces condensed against polished smooth steel surfaces (Jorgensen, 1965).

The present study seeks to evaluate optically *via* the replica technique the adaptability of amalgams of varying mercury alloy ratios condensed in cavities of diverse roughness.

## MATERIALS AND METHODS

Class I cavities were prepared in 45 extracted, noncarious human premolars using a #56 smooth fissure bur, a #556 cross-cut fissure bur and a Bowen cylindrical diamond stone. No correlation of diamond stone was made relative to chip shape, size and orientation. Prior to filling, the cavities were swabbed



TABLE I

| Group             | I                             | II                             | III                         |
|-------------------|-------------------------------|--------------------------------|-----------------------------|
| No. of Teeth      | 15                            | 15                             | 15                          |
| Hg/Alloy Ratio    | 7.3/5                         | 7.3/5                          | 5.8/5                       |
| Trituration Time* | 20 sec.                       | 20 sec.                        | 20 sec.                     |
| Mode of Insertion | "Wet" start<br>dry increments | "Dry" increments<br>throughout | No expression<br>of mercury |

\* Wig-L-Bug

with cotton pledgets, thoroughly washed with a water jet and dried with intermittent blasts of warm air.

The teeth were divided into three groups of 15 and each group was filled with amalgam as indicated in Table I.

Caulk optaloy pellets (6 grains) were triturated with mercury dispensed by a Caulk Mercury Dispenser.

Preceding trituration individual pellets and mercury spills were separately weighed. Plunger B in the mercury dispenser was selected for Group I and II and Plunger OP for Group III. The average mercury/alloy ratios calculated are given in Table I. The same capsule, cylindrical plastic pestle and amalgamator were used throughout the study. Each amalgamation was completed in 20 seconds. Further homogenization was obtained by trituration for one to two seconds without a pestle. Application of increments in the cavities was made exclusively with a B.D.M. Company amalgam carrier. In Group I initial insertions were of "wet" amalgam and as condensation progressed, "dry" amalgam increments were added. Excess mercury was removed during and after condensation. In Group II, however, a triturated mass of amalgam was

divided into portions and prior to insertion each increment was squeezed completely dry. Since no mercury oozed during condensation, removal of excess mercury was not necessitated. In Group III, on the other hand, where low mercury percentage (54%) was employed, expression of mercury was not executed.

In all the restorations, the condensation was performed by an electro-mallet with the intensity dial set at 3, frequency at 3600 and base speed at minimum.\*

The total time expended during condensation was two to three minutes. Subsequent to condensation, the over packed fillings were carved immediately and stored in normal saline solution for 48 hours. The teeth were then sectioned such that only the surface of the amalgam which was in contact with the buccal wall of the cavity was left intact. The restorations were separated from the cavity walls and both abutting surfaces, the buccal wall of the cavities and apposing restoration surfaces, were replicated.

\* As recommended by the manufacturer, Mc-Shirley Product, California.



### *Replication*

The surfaces to be replicated were coated with collodion solution and after drying the collodion films were stripped with fine forceps and transferred to glass slides with the replica surface facing upwards. The collodion replicas were then shadowed with palladium. Optical micrographs of the replicas were taken. These techniques were modified after those of Scott and Wyc-koff (1946).

### RESULTS

Group I fillings which were initiated with "wet" amalgams reproduced the cavity wall relief (Figs. 1-3A). Duplication of tool marks in the tooth structure by the amalgams was faithfully registered in Group I, irrespective of the cutting instruments used in cavity preparation. It was noted that even the most scabrous surfaces produced by diamond stones were well recorded by the amalgam (Figs. 3 and 3A). Significant differences in the degree of surface reproduction were not observed relative to the type of cutting tools used. No lamination was noted in the fillings.

Group II fillings in which exclusively dry increments were employed, demonstrated that the restoration surfaces were replete with pits and voids (Figs. 4-6A) not observed in the cavity surfaces. Incremental junctions which were a result of incomplete fusion of adjacent increments appeared as dark bands producing a stratified appearance of the filling (Figs. 4 A, 5 A and 6 A). The duplication of tooth surface topography was not well defined.

The data relative to the reproduction of the tool marks in Group III, on

the other hand, although superior to those of Group II, were not qualitatively of the standards of Group I. Occasional pits and, in rare instances, lamination could be observed in Group III restorations (Figs. 7-9 A).

The quality of surface reproduction appeared to be contingent upon manipulative technique rather than upon the roughness of the cavity surface.

### DISCUSSION

Faithful reproduction of cavity surfaces in Group I fillings is indicative of the superior adaptability of amalgams in which the initial insertion of the mix was "wet." The subsequent "dry" insertions appear to have utilized the excess mercury to produce a uniform condensation without a stratifying effect. Flögel (1965) has demonstrated that mercury tends to accumulate in the upper layers of the restoration as a result of condensation. It seems that there is enough mercury transfer from the deeper layers to maintain, in a plastic state, the subsequent "dry" increments. As suggested by Jorgensen (1965) the surface softening of the alloy particles during the process of amalgamation contributes to better adaptability. This condition appears to have been fulfilled by the excess mercury transferred from the deeper layers to the drier more superficial increments during the process of condensation.

Group II restorations appear to have yielded inferior results. In spite of the fact that each increment was squeezed immediately prior to insertion, adequate amounts of mercury were not available so that dryness of the mix caused voids and lamination separa-



ing the adjacent amalgam increments. Inasmuch as many operators insert amalgams as just described, restoration imperfections are especially significant in that these defects contribute to faulty fillings. It is interesting to note that in this group there is practically no oozing of surface mercury prior to carving. In the other groups, excess mercury was pooled at the surface and had to be removed during and after condensation. The amalgam mix after mercury expression in Group II was amorphous and lacked plasticity. These rendered the mix difficult to manipulate.

Duplication of the cavity walls by filling surfaces in Group III was relatively modest. The occasional occurrence of stratification tends to lend subjective support to the evaluation of the duplicating capacity of this type of amalgam mix.

The low mercury/alloy ratio technique (Eames, 1959) possesses certain distinct advantages such as a) it eliminates the need of mercury expression, and it facilitates manipulation, b) it produces a standardized mix and c) it results in an improved early strength. If reproducibility of the cavity wall by the restorative material can be accepted as a valid criterion for adaptation, the low mercury/alloy technique, in spite of its many advantages did not produce results comparable to those of the technique employed in Group I fillings. Sweeney and Burns (1961) have suggested that methods of mixing and packing are probably more important than the mercury/alloy ratio in effecting uniformity in the physical properties of amalgam. That the roughness of the prepared tooth surfaces did not affect the reproduction

of tool marks by the restorative material is indicated by a consistent quality of duplication in each group irrespective of the cutting instruments used. On this basis one might conclude that surface reproduction is contingent not upon surface topography but rather upon the degree of plasticity of the restorative material during condensation. This finding is contrary to that reported by Menegale *et al.*, (1960) in that their study indicated that marginal seepage is diminished as the cavity wall roughness increased.

The results of the present study cannot be equated with those of Menegale *et al.*, (1960) since protocol as well as evaluation criteria differences exist in the two studies.

It is logical to assume that the capacity of a restorative material to reproduce faithfully the cavity wall characteristics reflects the degree of adaptability and that absolute conformity is essential for retention and marginal seal. One cannot lose sight of the fact, however, that sustained contact between the restorative material and the cavity wall is similarly of paramount importance in the achievement of optimum seal and retention. Accordingly, dimensional stability of the filling material plays a most important role in this respect, and this aspect cannot be measured by the techniques employed in this study. If a more absolute evaluation is to be achieved, the techniques involved in this study as well as those utilizing tracers and micromasurements must be employed.

*Acknowledgements*—This work has been supported by the Public Health Service, Grant No. DE 02399-01, National Institute of Dental Research,



National Institutes of Health, Bethesda, Maryland.

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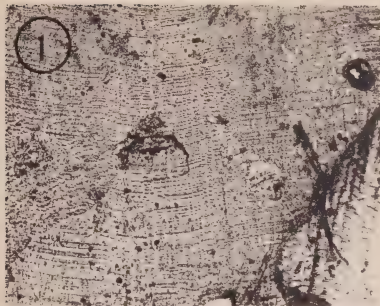


Fig. 1. Cavity surface prepared with a #56 smooth fissure bur. x 35.



Fig. 1 A. Amalgam (Group I) reproduction of area shown in Figure 1. x 35.



Fig. 2. Cavity wall prepared with a #556 cross-cut fissure bur. Note the horizontal major (M) and minor (m) bands. x 35.



Fig. 2 A. Restoration surface (Group I) corresponding to the tooth surface shown in Figure 2. Note the faithful reproduction of major and minor bands. x 35.

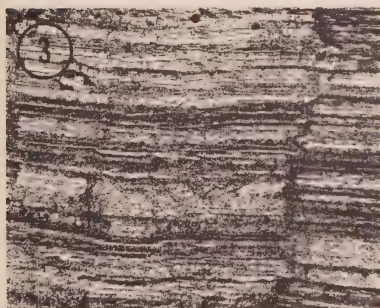


Fig. 3. Cavity surface prepared with a cylindrical diamond stone. The surface texture of this preparation is the roughest in the series.



Fig. 3 A. Amalgam surface (Group I) which abuts the cavity wall in Figure 3. The degree of reproduction of the cavity wall is comparable to that in Figure 1 A and Figure 2 A. x 35.



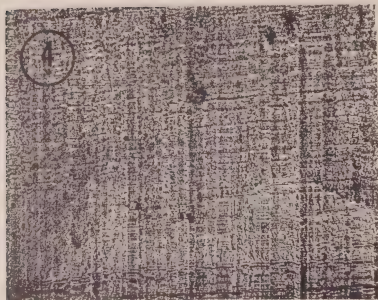


Fig. 4. Cavity surface prepared with a #56 smooth fissure bur. x 35.

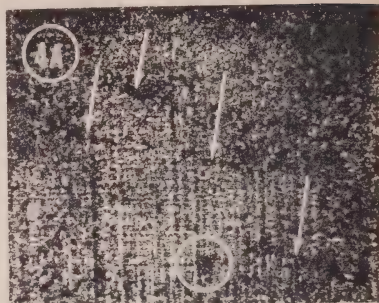


Fig. 4 A. Amalgam surface (Group II) facing area of the cavity shown in Figure 4. Some voids and smaller pits are circled. Arrows indicate junctions of subsequent amalgam increments. x 35.



Fig. 5. Cavity surface prepared with a #556 cross-cut fissure bur. (M) major bands (m) minor bands. x 35.

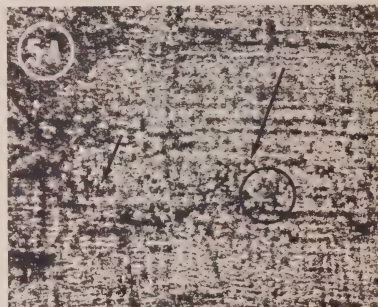


Fig. 5 A. Amalgam surface (Group II) corresponding to cavity wall shown in Figure 5. Voids and pits are circled. Arrows indicate junctions of subsequent amalgam increments. x 35.



Fig. 6. Cavity surface prepared with a diamond stone. x 35.

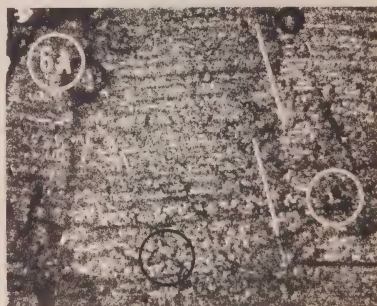


Fig. 6 A. Amalgam duplication (Group II) of cavity wall shown in Figure 6. Some voids and pits are circled. Arrows indicate junctions between amalgam increments. x 35.



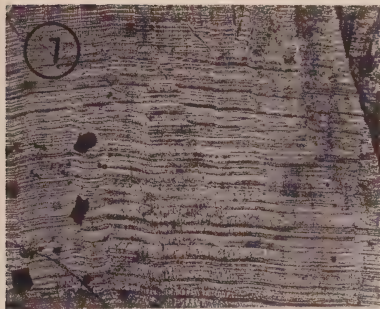


Fig. 7. Cavity prepared with a #56 smooth fissure bur. x 35.

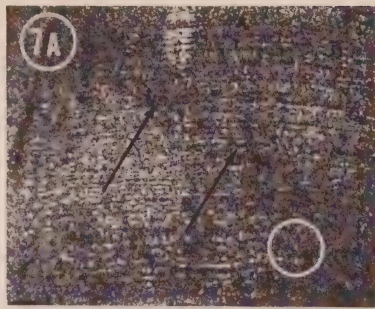


Fig. 7 A. Amalgam surface (Group III) corresponding to the cavity wall shown in Figure 7. Note pits (circle) and incremental junctions (arrows). x 35.

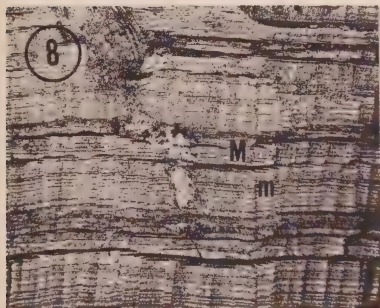


Fig. 8. Cavity surface prepared with a #556 cross-cut fissure bur. (M) major bands (m) minor bands. x 35.



Fig. 8 A. Amalgam surface (Group III) of cavity wall shown in Figure 8. x 35.

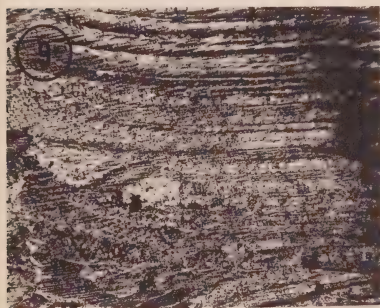


Fig. 9. Cavity wall prepared with a diamond stone. x 35.

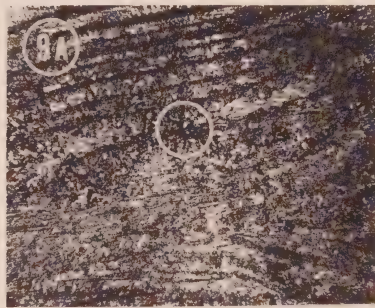


Fig. 9 A. Amalgam surface (Group III) corresponding to the cavity wall shown in Figure 9. Note voids (circle) in the filling. x 35.



# Format Recommendations For Contributors

## I. GENERAL INFORMATION

Two complete manuscripts with illustrations should be sent to the Editor, Journal, Baltimore College of Dental Surgery, University of Maryland School of Dentistry, Baltimore, Maryland 21201. The articles which are submitted for publication are expected to follow the format suggested below. It is assumed that the papers are based on original data and that they have not been published or previously submitted for publication in other Journals.

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Each article should be sequentially arranged as follows:

- A. Summary
- B. Introduction
- C. Materials and Methods
- D. Results
- E. Discussion
- F. Acknowledgements
- G. References

## III. TEXT REFERENCES

References cited in the text should include the author(s) last name and publication year as in "Doe and Brown (1966)". Multiple authorship (more than 2) is initially cited *in toto*. e.g. Doe, Brown and White (1966). Subsequent reference to the multiple authorship (more than 2) should be made as: Doe, *et al.*, (1966).

## IV. BIBLIOGRAPHIC REFERENCE

A. References cited bibliographically should be alphabetically and sequentially arranged as follows: author(s), year, article, title, Journal (Index Medicus preferred), volume and complete page coverage. Example:

Doe, J. J., Brown, D. M. and White, S. T. 1966. Fibrillogenesis in the dental sac. *The Journal* 21: 55-63.

B. Author(s) having two or more publications in a given year should be designated as *a*, *b*, etc. Examples:

Doe, S. S. and Brown, D. M. 1966*a*. Heterochromatin in oral epithelial cells. *The Journal* 20: 73-85.

——— 1966*b*. Cytochemical features of oral epithelium. *The Journal* 20: 98-110.

C. Book or monograph citations are arranged as:

Doe, S. S. and Brown, D. M. 1966. Inheritance and Development (Edited by White, S. T.) Chapt. 1, p. 16. University Press, Baltimore.

D. References which are in press or are personal communications are given as follows:

Doe, J. J. 1966. Fibrillogenesis in the dental sac. *The Journal* (in press).

Brown, D. M. 1966. (personal communication).

## V. ILLUSTRATIONS, LEGENDS AND TABLES

A. All illustrative material excluding tables should be indicated as figures (Fig. 0), and submitted as mounted glossy prints. The illustrations singly or grouped should not exceed 5" x 7". Labels, lead lines, arrows or other designations should be indicated on the print and each illustration should be numbered consecutively. The back of the illustration should bear the following information:

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B. Legends should be brief and should not duplicate text material. Pertinent information including label explanation, technical data such as stains, etc., and magnification should be given.

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*Cover photograph: Architect's rendering of the proposed  
University of Maryland School of Dentistry*



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# Histochemical Study of Molar Teeth in Full-Term Rhesus Fetuses (*Macaca Mulatta*)

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**SUMMARY**—Dissected molar teeth of seven full term Rhesus fetuses were fixed in cool four per cent glutaraldehyde solution in 0.1 M cacodylate buffer at a pH of 7.2. After two hours fixation the tissues were washed and maintained in 0.2 M solution of sucrose using the same buffer. Decalcification was obtained with EDTA following the procedure of Fullmer and Link. Cryostat sections were made for enzymatic techniques and lipid staining with Sudan Black B, and sections of paraffin embedded material for the other techniques. Alkaline phosphatase (Gomori's and Burstone's technique) was espe-

cially intense in the odontoblasts and cells of the stratum intermedium and acid phosphatase (Gomori's and Burstone's techniques) in odontoblasts and ameloblasts. Glycogen (PAS/diastase) and ribonucleic acid (toluidine blue/ribonuclease) were detected in ameloblasts and odontoblasts of the cervical region. Lipids exhibited a wider distribution. Our results in general, agree with those obtained by other investigators in other species and of other ages. This study constituted the necessary background for a more in-depth study involving submicroscopical cytochemistry.

## INTRODUCTION

The application of various histochemical techniques to dental tissues at different stages of development has contributed to a broadened understanding of the mechanisms underlying tooth differentiation (Fullmer, 1964 and 1965). Most of the histochemical studies have been made, however, in rodent material and it appears to be important to compare these results with those obtained in human material. Difficulties in obtaining human fetal tissues in an adequate state of preservation explains the fact that histochemical work in this field is relatively scarce (Mathiessen, 1966). The accumulation of histochemical data based on primate material, is thus, highly desirable; not only because of its similarity to human tissues, but also because of the ease of obtaining fresh tissue which can be processed immediately.

The following is a preliminary histochemical study of molar teeth in the

Rhesus monkey and constitutes the necessary background for further cytochemical studies. The initial results of these studies will be reported elsewhere (Sisca, Narbaitz and Provenza, 1968).

## MATERIALS AND METHODS

Molar teeth of six *Macacus* term fetuses, which were obtained by Caesarean operation and killed by nembutal overdosage, were dissected and fixed immediately in cool 4 per cent glutaraldehyde in 0.1 M cacodylate buffer at pH 7.4. After two hours fixation, the tissues were allowed to remain in a 0.2 M sucrose solution in 0.1 M cacodylate buffer (pH 7.4) until used. Decalcification of the teeth was executed utilizing the procedure of Fullmer and Link (1964). Demineralization was maintained over a four day period after which the tissues were washed with sucrose/cacodylate solution.

The tissues used for enzymatic techniques were sectioned at fifteen microns



with an International Cryostat (Model CT). Sections were carried directly to the appropriate incubation medium. Alkaline phosphatase activity was detected through incubation in Gomori's (1952) medium for one hour or in Burstone's (1958) medium for fifteen minutes at room temperature. Acid phosphatase activity was demonstrated by incubating sections in Gomori's (1952) medium as modified by Barka and Anderson (1963) for one hour at 37°C or in Burstone's (1958) medium as modified by Barka (1960) for one hour at room temperature. Control sections for both alkaline and acid phosphatases were incubated in media lacking the substrate.

Tissues used for lipid identification were embedded in gelatin after decalcification, sectioned with the cryostat and stained with Sudan Black B in propylene glycol according to Pearse (1961).

The remaining histochemical techniques were applied to tissues embedded in paraffin after decalcification and sectioned at seven microns. Glycogen and mucopolysaccharides were identified by the Periodic Acid-Schiff (PAS) reaction controlled by diastase digestion (Pearse, 1961) and metachromasia following toluidine blue staining (Pearse, 1961). Ribonucleic acid (RNA) was identified by the use of toluidine blue solutions at pH 4.0, ribonuclease extraction (Pearse, 1961) and by Einarson's gallocyanin technique (1932).

### RESULTS

The techniques employed for fixation and decalcification of the tissue provided good preservation and appeared adequate for all the histochemical techniques used. The reactions for RNA, however, were not as intense as those obtained by previous investigations in other species. The apparent diminution in reaction in-

tensity may be attributed to the partial extraction of the substance in tissue processing.

**RNA.** A moderate amount of basophilia appeared in the odontoblasts (Fig. 1), ameloblasts and stratum intermedium cells (Fig. 2). The reaction was more intense in the cervical region of the developing teeth. Following digestion with ribonuclease the basophilia disappeared indicating the presence of RNA. Basal cells of the oral epithelium included in the same sections were used for comparison. In these cells the basophilia was appreciably more intense than those in the cells of the enamel organ.

**Lipids.** Odontoblasts, ameloblasts and stratum intermedium cells contained a moderate amount of sudanophilic granules in the cytoplasm (Figs. 3 and 4).

**Carbohydrates.** Metachromasia with toluidine blue was very intense in the connective tissue of the dental papilla (Fig. 5) especially in the cervical region (Fig. 6). Metachromatic material was also observed in the dental sac connective tissue. PAS positive material was observed both in ameloblasts, stratum intermedium and odontoblasts (Figs. 7 and 8). In these cells, the intensity of the stain was higher in the cervical region. The stain was only partially removed by diastase digestion (Figs. 9 and 10). This indicated that glycogen and mucoproteins were present in the cells. A control section of oral epithelium (Fig. 11) which demonstrates large amounts of glycogen was stained with PAS. That the digestion time was adequate was substantiated by the disappearance of the PAS stain in the cells of the oral epithelium (Fig. 12).

**Enzymes.** Alkaline phosphatase activity as demonstrated by the Burstone



method, was very intense in odontoblasts, subodontoblastic zone and stratum intermedium cells (Fig. 13). Ameloblasts demonstrated very low enzymatic activity which was restricted to the basal part of the cell (Fig. 14). Localization and intensity of the reactions were similar to those above in sections stained and incubated with Gomori's media (Fig. 15). Acid phosphatase activity utilizing the modified Burstone's technique was especially intense in the ameloblasts and odontoblasts (Fig. 16). The activity was evenly distributed throughout the cytoplasm (Fig. 17). Isolated groups of cells in the dental sac which probably represent histiocytes exhibit intense acid phosphatase activity (Fig. 18). Cells of the stratum intermedium exhibited very weak activity.

#### DISCUSSION

The histochemical data relative to the localization of RNA, carbohydrates and lipids as found in this laboratory in monkey tooth germs in the appositional stage coincide with those found by other investigators in other species (Fullmer, 1964 and 1965). It is known that cytoplasmic RNA is related to protein synthesis and it is, thus, not surprising that ameloblasts, stratum intermedium cells and odontoblasts are particularly rich in this substance during the period in which they are engaged in the synthesis of enamel matrix and predentin respectively. The presence of glycogen in these cells with high metabolic activity is also understandable.

The presence of lipid droplets in ameloblasts and odontoblasts had been already recorded by Irving (1958) and Stewart, Claiborne and Luikart (1965) in rat teeth. It has been postulated that these lipid deposits are related in

some way with the calcification process.

The localization of alkaline phosphatase in the tooth primordia has been a subject of discussion. With respect to ameloblasts, some individuals believe that they demonstrate a positive alkaline phosphatase reaction (Bevelander and Johnson, 1945 and 1949; Wislocki and Sognnaes, 1950; Pourtois, 1962). Others maintain that these cells are devoid of enzymatic reaction (Engel and Furuta, 1942; Gomori, 1943; Burstone, 1960; Ten Cate, 1962; Mathiessen, 1966). The results in this laboratory are in accord with the latter group of investigators. Engel and Furuta (1942), Gomori (1943) and Sasso and Castro (1957) have been unable to demonstrate alkaline phosphatase activity in odontoblasts. The general belief of most other researchers that enzymatic activity is present both in the odontoblastic and subodontoblastic layers, is in agreement with the results reported herein.

Relative to Mathiessen's results on human material, our data similarly demonstrated strong acid phosphatase activity both in ameloblasts and odontoblasts. The activity of this enzyme in histiocytes in the proximity of the stratum intermedium have also been mentioned by Mathiessen (1966).

#### ACKNOWLEDGEMENTS

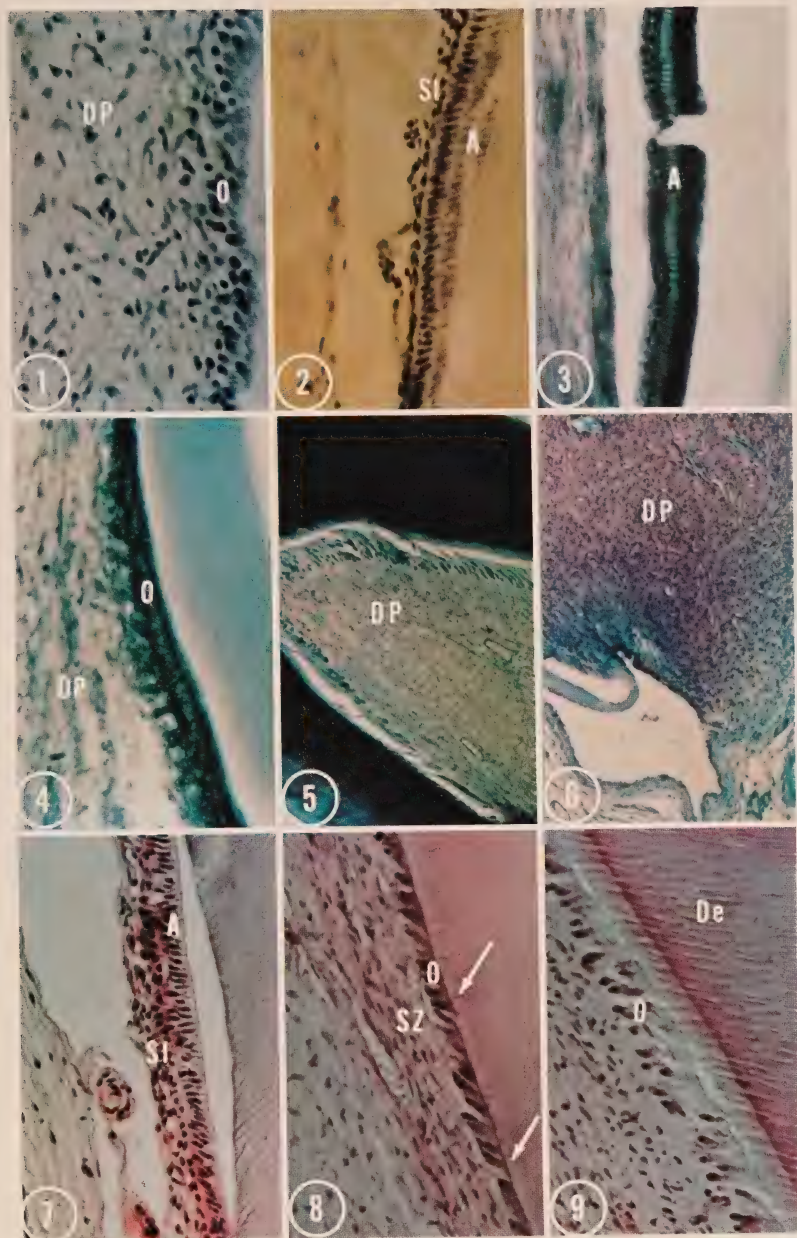
The monkey fetuses used in this experiment were obtained from the Embryological Laboratory of the Carnegie Institution of Washington at Baltimore. The investigators are indebted to Dr. Elizabeth Ramsey who provided us with this valuable material and to Dr. James D. Ebert, Director of the Carnegie Institution of Washington.

This study was supported by the U. S. Public Health Service Grant HD-1842-03 from the National Institute of Child Health and Human Development, National Institutes of Health, Bethesda, Maryland.



- FIG. 1. Control section for ribonucleic acid localization. Toluidine blue stain. Cervical region of the developing enamel organ. Note the moderate amount of basophilia in the odontoblasts (O) adjacent to the dental papilla (DP). x 400.
- FIG. 2. Ribonucleic acid. Gallocyenin stain. The basophilic granules are confined to the distal region of the ameloblasts (A) and stratum intermedium cells (SI). x 400.
- FIG. 3. Lipid. Sudan Black B stain. Ameloblasts (A) demonstrate sudanophilic granules in the distal region of the cytoplasm. x 100.
- FIG. 4. Lipid. Sudan Black B stain. Lipid granules in the odontoblasts (O) with the subjacent dental papilla (DP). x 100.
- FIG. 5. Carbohydrates. Toluidine blue stain. Metachromatic material in the substance of the dental papilla (DP). x 100.
- FIG. 6. Carbohydrates. Toluidine blue stain. The metachromatic substance in the dental papilla (DP) was more intense in the cervical region. x 100.
- FIG. 7. Carbohydrates. Periodic acid-Schiff. Stained material observed in the ameloblastic (A) and stratum intermedium layers (SI). x 400.
- FIG. 8. Carbohydrates. Periodic acid-Schiff. Stained material observed in the odontoblasts (O) and subodontoblastic zone (SZ). Note odontoblastic processes (arrows). x 400.
- FIG. 9. Carbohydrates. After diastase digestion, the PAS positivity was diminished in the odontoblasts (O) subjacent to mature dentin (De). x 400.

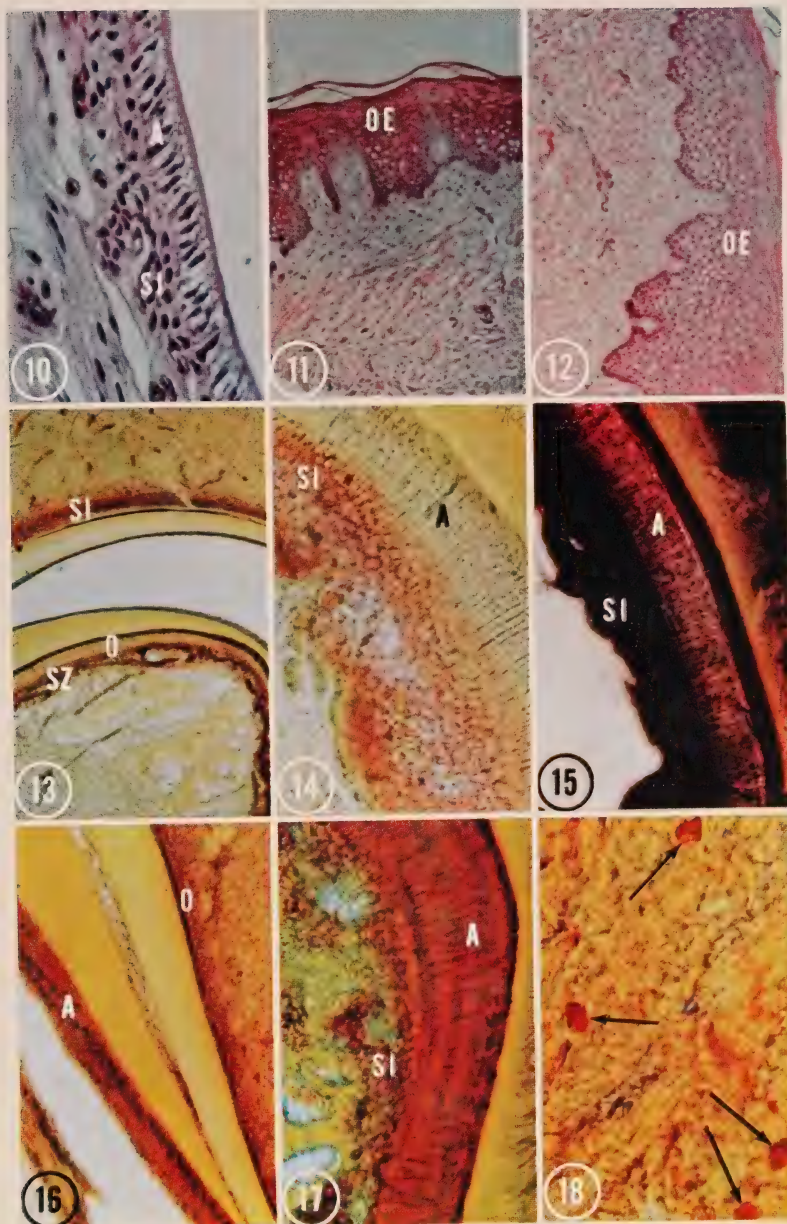






- FIG. 10. Carbohydrates. After diastase digestion, the PAS positivity was diminished in the ameloblasts (A) and stratum intermedium (SI). x 400.
- FIG. 11. Glycogen accumulations in the oral epithelial cells (OE) as indicated by the PAS stain technique. x 100.
- FIG. 12. Disappearance of glycogen from the cells of the oral epithelium (OE) following diastase digestion. x 100.
- FIG. 13. Alkaline phosphatase. Burstone method. Localization of the enzyme in the subodontoblastic zone (SZ), odontoblasts (O) and stratum intermedium cells (SI) as indicated by the brownish to black deposits. x 40.
- FIG. 14. Alkaline phosphatase. Burstone method. Diminished enzymatic activity in the basal region of the ameloblasts (A) and greater concentration in the cells of the stratum intermedium (SI). x 400.
- FIG. 15. Alkaline phosphatase. Gomori method. Minimal enzyme accumulation in the basal portion of the ameloblast (A) but heavy black deposits in the stratum intermedium (SI). x 100.
- FIG. 16. Acid phosphatase. Modified Burstone method. Intense enzyme reaction in the ameloblasts (A) and odontoblasts (O) as demonstrated by the red stained material. x 100.
- FIG. 17. Acid phosphatase. Modified Burstone method. Even distribution of the enzyme throughout the cytoplasm as is exemplified in the ameloblasts (A) shown here. The stratum intermedium (SI) is adjacent to the ameloblasts. x 400.
- FIG. 18. Acid phosphatase. Modified Burstone method. Isolated groups of cells exhibiting intense enzyme activity (arrows). x 400.







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# ACTION OF THE 2 $\alpha$ -CYANO-4, 17 $\alpha$ -TRIMETHYL-ANDROST-5-EN-17 $\beta$ -OL-3-ONE (2 $\alpha$ -CYANO-KETONE) ON THE CHICK EMBRYO

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**SUMMARY**—The purpose of this study was to determine the inhibitory action of 2 $\alpha$ -cyano-ketone on the enzyme 3 $\beta$ -hydroxysteroid dehydrogenase which is found on the gonads of chick embryos and participates in sex differentiation.

The results of these tests indicated that there was no apparent effect on the enzyme nor on sex differentiation with the administration of 2 $\alpha$ -cyano-ketones. Various degrees of micromelia were, however, noted on experimental specimens.

## INTRODUCTION

Steroids play an important role during sexual differentiation. It has been shown in the chick embryo that estrogens are responsible for the differentiation of the ovarian cortex and androgens for the involution of the Müller ducts in the males (Burns, 1961). The synthesis of steroids in the chick embryo appears to follow a metabolic pathway which is similar to that in adult tissues. The enzyme, 3 $\beta$ -hydroxysteroid dehydrogenase, which is always found in tissues engaged in steroid hormone production, has also been identified in differentiating chick gonads (Narbaitz and Kolodny, 1964; Chieffi, Manelli, Botte and Mastrolia, 1964).

Potts, Burnam and Beyler (1963) have shown that 2 $\alpha$ -cyano-ketone, when injected into rats, produced a marked adrenal hyperplasia which is prevented by simultaneous administration of glucocorticoids. Goldman, Bongiovanni and Yakovac (1966) demonstrated that the same drug injected into pregnant rats produced alterations in adrenal and genital development by inactivation of the 3 $\beta$ -hydroxysteroid dehydrogenase.

The present work was designed to ascertain if the drug (2 $\alpha$ -cyano-ketone)

could also inhibit the production of the enzyme (3 $\beta$ -hydroxysteroid dehydrogenase) in chick embryo gonads and thus interfere with sexual differentiation. In the course of this study, gross malformations were also observed in the treated embryos and will be reported.

## MATERIALS AND METHODS

Fourteen series of experiments utilizing a total of three hundred ninety-four White Leghorn chick embryos were performed. Table I gives the doses and injection schedules followed during the series of experiments.

2 $\alpha$ -cyano-4, 17 $\alpha$ trimethylandro-5-en-17 $\beta$ -ol-3-one\* was dissolved in corn oil (12.5 mg/ml). Dissolution was facilitated by the previous addition of a small amount of absolute ethanol which was afterwards eliminated by evaporation. Embryos used as controls were injected with corn oil previously mixed with absolute ethanol which was later evaporated before injection. All injections were made on the chorio-allantoic membrane.

After macroscopical examination, embryos were dissected and the whole genital apparatus was examined, special

\*Supplied by Dr. G. O. Potts, Sterling-Winthrop Research Institute.



care being taken to establish the development of Müller ducts. The gonads and adrenal glands were separated and some of each were sectioned with a cryostat (International Model C. T.) to be incubated for  $3\beta$ -hydroxysteroid dehydrogenase utilizing the Levy, Deane and Rubin technique (1959). The remainder were fixed in Bouin's fixative, dehydrated, embedded in paraffin, sectioned and stained with hematoxylin and eosin.

Proximal portions of the hind limbs of several malformed and control embryos were dissected for comparison.

### RESULTS

Experimental series 1 to 4 (Table I) were studied in order to establish the optimal dose to be used. Low doses (0.5 mg. per embryo) did not affect embryonic development. Doses of 1.25 mg. or higher, increased the percentage of mortality and produced significant amounts of malformations. The entire body size was smaller than that of the control embryos (Fig. 1), but, in addition, many of the embryos showed various degrees of micromelia, which especially affected the proximal part of the hind limbs (Fig. 2). The size of the neck and beak was also affected although to a lesser degree. Both gonads and genital ducts appeared to be unaffected. The histochemical technique for  $3\beta$ -hydroxysteroid dehydrogenase gave positive reactions in adrenal glands and gonads of the embryos in the experimental series.

Series 5 to 12 were designed to determine whether a dose of 1.25 mg./embryo, which in the previous series was shown to be the optimal, would cause different results if there were a variation in the age of the embryo in which the injection was made.

Maximal effect was observed when in-

jection was made on the third incubation day. Not only was the percentage of malformations higher, but unilateral microphthalmia in addition to micromelia was also present in a great proportion of the embryos. Embryos injected on the fifth and sixth day still presented malformations, but of a milder degree. Those injected on the seventh day did not show malformations. No genital alterations were found in any of these groups. The  $3\beta$ -hydroxysteroid dehydrogenase reaction was always positive both in gonads and adrenal glands.

Series 13 and 14 were designed to determine if the enzyme could be inhibited at older ages. As in previous series it was concluded that no apparent degree of inhibition was present, as judged through the comparison between reactions in injected and control embryos.

### DISCUSSION

It has been shown that the 2 $\alpha$ -cyano-ketone inhibits the  $3\beta$ -hydroxysteroid dehydrogenase both in mammals and microorganisms (Goldman, 1967). This fact appears to indicate that the inhibition phenomenon is not specific with regards to taxonomic origin of the enzyme. Our experiments have failed, however, to detect any inhibition of the enzyme in the chick embryo. Histochemical reactions appeared to show the same intensity in experimental and control embryos. Alterations of genital development, which would be expected if an alteration of steroid hormone production had occurred, were also absent.

Our failure to detect inhibition may be due to problems related to dose or rate of absorption of the drug. The maximal dose used was limited both by the low solubility of the drug in the vehicle used and by the fact that higher doses were highly teratogenic. Nevertheless, the



fact that gross malformations appeared in a great percentage of cases indicates that at least a small amount of the drug was absorbed. Even in these cases no detectable amount of inhibition was observed. In order to clarify this problem experiments have been planned in which the drug will be added to culture media in which embryonic gonads and adrenals are explanted.

Micromelias similar to those described by us have been produced by a variety of other substances such as: sulfanilamide and eserine sulfate (Ancel, 1945); insulin (Landauer, 1947); thallium (Karnofsky, Ridgeway and Patterson, 1950); boric acid (Landauer, 1952); pilocarpine (Landauer, 1953); amphetamine and phenmetrazine (Montuori and Narbaitz,

1963). The critical developmental period has been demonstrated, however, to be different for each of the substances tested. The 2 $\alpha$ -cyano-ketone, utilized in this experiment, demonstrates its maximal effect when injected on the third day. Cortisone, another steroid known to produce micromelia acts specifically when injected after the eighth day (Karnofsky, Ridgeway and Patterson, 1951). Although additional studies are needed, these differences may help to elucidate the mechanism of the action of each substance.

This study was supported in part by U. S. Public Health Training Grant # T1 DE 162-03, National Institutes of Health, Bethesda, Maryland.

TABLE I  
RESULTS OBTAINED FOLLOWING INJECTION OF 2 $\alpha$ -CYANO-KETONE TO CHICK EMBRYOS

| Series | Dose (mg) | Number of Embryos | Incubation Age when injected Days | Incubation Age when sacrificed Days | Mortality (Percentage) | Malformations (Percentage) |
|--------|-----------|-------------------|-----------------------------------|-------------------------------------|------------------------|----------------------------|
| 1      | 0.5       | 30                | 4                                 | 10                                  | 5                      | —                          |
| 2      | 1.25      | 50                | 4                                 | 10                                  | 20                     | 50                         |
| 3      | 2.50      | 20                | 4                                 | 10                                  | 40                     | 95                         |
| 4      | control   | 30                | 4                                 | 10                                  | 4                      | —                          |
| 5      | 1.25      | 24                | 3                                 | 10                                  | 17                     | 90                         |
| 6      | 1.25      | 24                | 5                                 | 10                                  | 13                     | 45                         |
| 7      | 1.25      | 24                | 6                                 | 10                                  | 14                     | 30                         |
| 8      | 1.25      | 24                | 7                                 | 10                                  | 3                      | —                          |
| 9-12   | controls  | 120               | 3-7                               | 10                                  | 7                      | —                          |
| 13     | 1.25      | 24                | 7                                 | 12                                  | 3                      | —                          |
| 14     | 1.25      | 24                | 10                                | 14                                  | 4                      | —                          |



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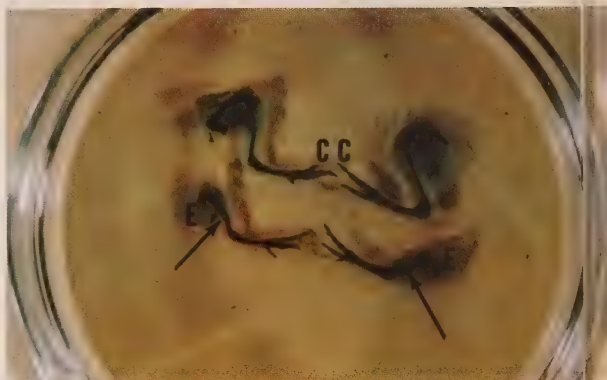
Figure 2

Hind limbs of Experimental and Control Embryos

- E. Hind limb of ten-day embryo injected on the fourth day with 1.25 mg of 2  $\alpha$ -cyano-ketone. Note differences in length of legs, bone sizes and shapes. Malformations of bones are indicated by arrows.
- C. Hind limb control ten-day chick embryo injected on the fourth day with corn oil. (actual size)

Figure 1  
Experimental and Control Embryos

- E. Ten-day chick embryo injected on the fourth day with 1.25 mg of 2  $\alpha$ -cyano-ketone.
- C. Ten-day chick control embryo injected on the fourth day with corn oil. (actual size)





# The Development and Function of the Minor Salivary Glands of the Human Fetal Hard Palate

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**SUMMARY**—The palatal salivary glands appear to start as invaginations of the mucosa after the eighth week and prior to the twelfth week. By the twelfth week, these glands produce a product which is mucicarmine and PAS positive. The

ducts are patent and this product appears to be secreted. By the fourteenth week the ducts and acini appear to be well developed and functioning normally.

## INTRODUCTION

During the course of a study of midline palatal cysts, a relationship was observed between the development of the minor salivary glands of the hard palate and posterior midline keratin cysts. The standard texts in the fields of histology and embryology (Provenza, 1964; Sicher, 1966; Arey, 1965) contain scant information on the development of the minor glands and a review of the scattered literature revealed little more (McMillan and Tongue, 1962; McFall and Kraus, 1963). Of the few articles that were available the majority were concerned with the development of the rat rather than humans. Rat fetuses normally demonstrate immature glands at birth and these glands do not begin to function until a few days postpartum (Burgen, 1960). Our preliminary observations seemed to indicate that this was not true of the human fetus.

The commonly held concept is that the minor salivary glands of the human hard palate begin to develop in the third fetal month and do not start to function until after birth (Arey, 1965). Our observations led us to examine our human fetal material in an attempt to determine a chronology for the morphologic and physiologic development of the palatal glands.

## MATERIALS AND METHODS

The palates of twenty-two human fetuses ranging in age from eight weeks to twenty weeks were fixed in 10% neutral buffered formalin, dehydrated in alcohol, cleared in xylene and embedded in paraffin. Serial sections were made and every 10th step was stained with hematoxylin and eosin. As many of the remaining sections as were needed were stained with mucicarmine and periodic acid-Schiff. Mucicarmine is a stain used to demonstrate epithelial mucin and the periodic acid-Schiff reaction is used to demonstrate polysaccharides (Lillie, 1954). The intensity of the PAS reaction is variable and does not indicate the amount of polysaccharide present. The sections were then examined with the aid of a light microscope. Table I shows the results of the special stains and the distribution of the fetuses according to age and crown-rump length. Ages were determined according to a modification of the table of Patten by Wood and Kraus (1962).

## RESULTS

The eight week old specimens did not demonstrate salivary gland buds (Fig. 1). The specimens between the age of eight and twelve weeks demonstrated invaginations of the oral mucosa that were round to pear shaped and consisted of



solid nests of cells (Fig. 2). The specimens at twelve weeks of age demonstrated patent ducts and apparently immature acini (Fig. 3). There was evidence of secretory function in the positive mucicarmine and PAS reaction. The specimens at thirteen weeks still demonstrated relatively immature acini. From the fourteenth week on acini had developed and they appeared to secrete a mucicarmine and PAS positive product (Fig. 4).

### DISCUSSION

Between the eighth and twelfth week the palatal mucosa of the human fetus develops solid buds or cords for the palatal salivary glands. A single observation on a ten week old fetus seems to indicate that this development takes place between the tenth and twelfth week. By the twelfth week the buds or cords begin to show patent ducts. The lining of these ducts is continuous with

the surface epithelium and the ducts contain small amounts of a mucicarmine positive and periodic acid-Schiff (PAS) positive material.

By the thirteenth week the ducts are patent and the acini of the glands are starting to develop morphologically. In the fourteenth week the palatal salivary glands histologically appear mature and seem to be secreting significantly more of the mucicarmine and PAS positive material.

The role of the secretion in utero is unknown. Perhaps because the concentration of urea increases in the amniotic fluid during development (Windle, 1940), the secretory product, mucous, acts to coat the fetus and thereby aid in preventing irritation from the amniotic fluid.

This study was supported by U. S. Public Health Service Grant 5 Sol FR.05317.06 from the National Institute of Dental Research, Bethesda, Maryland.

TABLE I  
RESULTS OF MUCICARMINE AND PAS STAINS BY FETAL AGE

| <i>C-R Length<br/>in mm.</i> | <i>Age in<br/>Weeks</i> | <i>Mucicarmine</i> | <i>PAS</i> |
|------------------------------|-------------------------|--------------------|------------|
| 25                           | 8                       | —                  | —          |
| 25                           | 8                       | —                  | —          |
| 80                           | 12                      | —                  | +          |
| 85                           | 12                      | +                  | (faint)    |
| 85                           | 12                      | +                  | (faint)    |
| 90                           | 13                      | +                  | +          |
| 90                           | 13                      | +                  | +          |
| 95                           | 13                      | +                  | +          |
| 100                          | 14                      | +                  | +          |
| 100                          | 14                      | +                  | +          |
| 100                          | 14                      | +                  | +          |
| 100                          | 14                      | +                  | +          |
| 105                          | 14                      | +                  | +          |
| 117                          | 15                      | +                  | +          |
| 120                          | 15                      | +                  | +          |
| 135                          | 16                      | +                  | +          |
| 135                          | 16                      | +                  | +          |
| 135                          | 16                      | +                  | +          |
| 145                          | 17                      | +                  | +          |
| 160                          | 18                      | +                  | +          |
| 190                          | 20                      | +                  | +          |
| Head Circumference<br>21 cm. | 20                      | +                  | +          |



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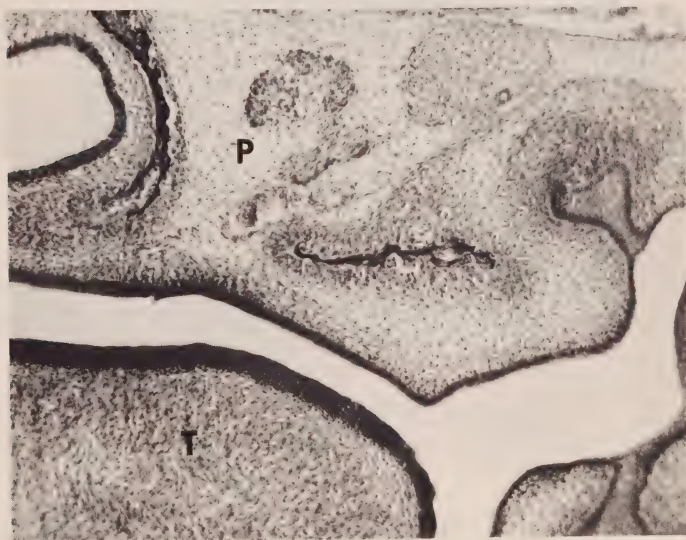


FIG. 1. Frontal section through posterior hard palate area (P) of an eight week human fetus. Note absence of rete pegs and salivary gland buds. Tongue (T).

H 1 E, approximately 35x.



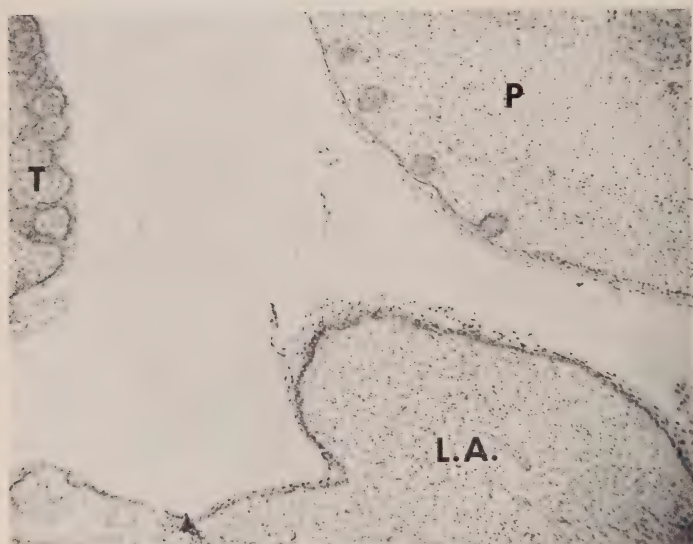


FIG. 2. Salivary gland buds forming in posterior hard palate area (P) of an eleven week human fetus. Tongue (T). Lower arch (L.A.).

H 1 E, approximately 35x.

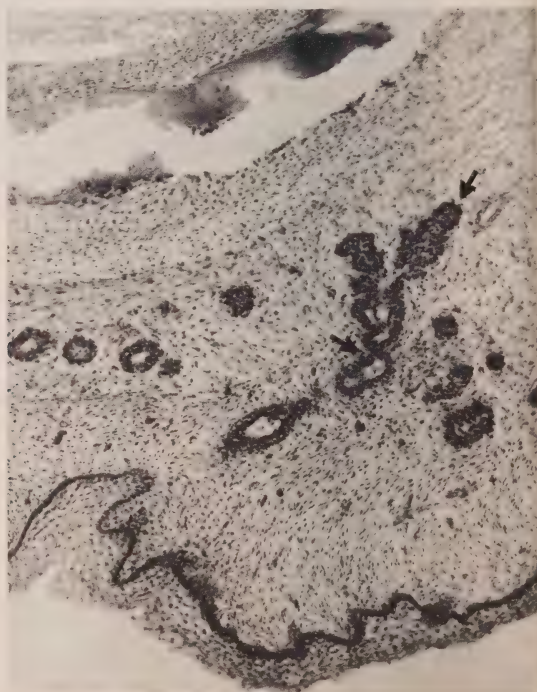


FIG. 3. Early duct and acinar development in a thirteen week human fetus (indicated by arrows).

mucicarmine, approximately 35x.



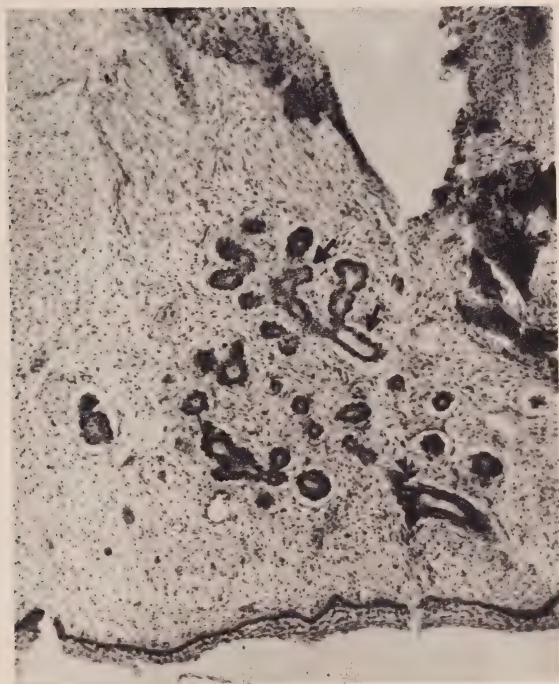


FIG. 4. Advanced ductual and acinar development in a fourteen week human fetus (indicated by arrows).

H 1 E, approximately 35x.







# An In Situ, In Vivo Nerve Chamber

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**SUMMARY**—A compact, light weight nerve chamber suitable for stimulation and recording of tissue bio-potentials was devised for use *in situ, in vivo*. The distance between stimulation and recording electrode pairs is accurate and fixed for conduction velocity determinations. The chamber may be easily removed from the

apparatus for sterilization. The nickel and gold plated electrodes on the nerve board chamber have conventional connectors for attaching to standard stimulating and recording components. Sample quantitative data obtained with this device is presented.

Helmholtz first measured conduction velocity in peripheral nerve tissue in 1850, but the data obtained by Erlanger and Gasser in 1925-1940 yielded the first lucid explanation of characteristics of the peripheral nerve action potential. Their classic research, for which they were awarded the Nobel prize, related the bioelectric activity to structure and function. Considering the stage of development of electronic apparatus *circa* 1930-40, Gasser, Erlanger and their students achieved records of bioelectric activity and quantitative data therefrom that were both elegant and remarkable. (Blair and Erlanger, 1933, Erlanger and Gasser, 1937).

Since then many nerve receptacle devices have been utilized in preparation for recording compound action potentials of peripheral nerves. All these instruments have had one characteristic in common; the necessity for removing the tissue from the animal, and placing it in the nerve chamber in order to contact the stimulating and recording electrodes. The nerve board presented here obviates the necessity for such a drastic departure from the physiologic state. The plastic wafer containing the stimulating and recording electrodes may be slipped under the nerve *in situ*, in the surgical field of a chronic or an acute preparation *in vivo*, without unduly disturbing the

blood supply, temperature, sterility, or other essential factors of the normal tissue environment.

A simple diagrammatic schema is shown in Figure I. The distance of 2 cm. between the stimulating and recording electrodes has a tolerance of  $\pm 0.1$  mm, making it possible to determine nerve conduction velocities with an accuracy greater than  $\pm 1$  percent when two centimeters of nerve are used. If a longer nerve is available two nerve boards may be used, connecting the stimulation source to one pair of electrodes on the first board, and the recording component to a pair of electrodes on the second board. Using this technique, the accuracy of the measurement of the length of nerve depends on the device used for measuring the distance between the two pairs of electrodes.

The degree of tolerance on the inter-electrode distance is achieved by a printed circuit technique, which allows the photographic reduction from the drawing board layout to the completed nerve board. This has been accomplished by photographing the electrode configuration on copper-clad printed circuit material, then etching off the unwanted metal. In a prototype model\* unplated

\* Original design and construction by J. D. Staling.



copper electrodes were used, and tissue deterioration was marked after several hours of use. The electrodes in the present model are nickel and gold plated to reduce reaction to tissue enzymes, allowing much longer periods of nerve tissue-to-electrode contact without appreciable change in the physiologic characteristic being measured.

Figure 2 shows the nerve board in use, placed *in situ*, for stimulating and recording action potentials generated by the sciatic nerve of a frog, and portrayed electronically by a cathode ray oscillograph. The tube face of the CRO is being photographed for action potential quantitation on latency, threshold, and conduction velocity data. Figure 3 shows a typical example of the picture used for measurements.

Using a preparation as seen in Figure 2 and 3, on two *Rana* species, the leopard frog and bullfrog, conduction velocities were obtained for the three peaks of the compound action potential which correspond to the three sizes of the A fibers. Ten animals were used in each species. Both sciatic nerves used cover a length range of 2.0 to 8.2 cm in the bullfrog, and 2.0 to 4.9 cm in the leopard frog. All determinations were done at room temperature.

The velocity values determined from the three action potential peaks demonstrated by the *Rana pipiens*' sciatic nerves were 43.6, 23.2 and 15.8 meters per second, average figures from ten animals. Values determined from the *Rana catesbeiana* sciatic nerves, also on ten animals, were 57.6, 29.5 and 15.3 meters per second. These velocity values of the three action potential peaks demonstrated a linear relation to the fiber diameters described by Erlanger and Gasser (1927) for alpha, beta and

gamma fibers of the A group on these two animals. The direct relationship of nerve fiber diameter to conduction velocity concurs with the conclusions of Erlanger and Gasser and other authors (Brazier, 1951).

In Figure 4, typical strength-duration curves on the two species are shown. The thresholds were determined on the largest, fastest fibers of the A group in all instances. The plot is an average of three different stimulation frequencies; ten, twenty, and thirty cycles per second (Hertz, Hz). No significant difference within these frequency changes was seen in threshold response.

These two samples of data obtained by using the printed circuit nerve board chamber are cited as examples of practical application of the device in experimental techniques. The ruggedness of the electrodes' assembly also is practical for use by student and other semi-skilled technicians in laboratory classes for routine demonstrations of peripheral nerve characteristics. Since the nerve board may be removed easily from the connector assembly and sterilized without change of dimensions, it is usable in human acute preparations where accurate *in situ* velocity measurements are desirable.

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FIGURE 1

SCHEMA OF TOP AND SIDE VIEWS OF NERVE BOARD APPARATUS

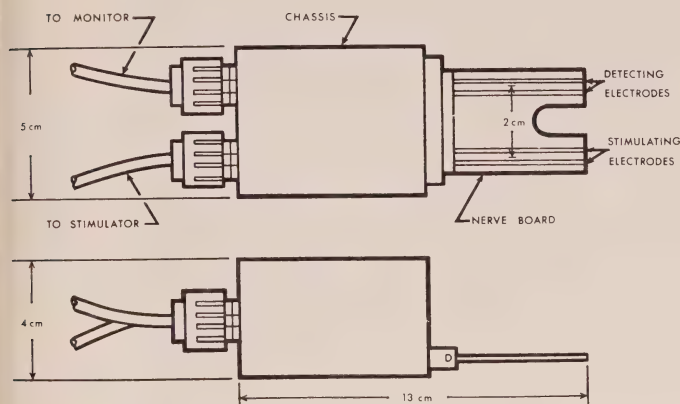


FIG. 1. Schema of Top and Side Views of Nerve Board Apparatus

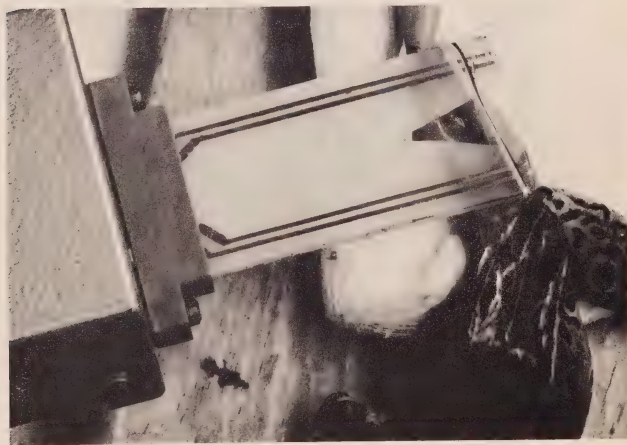


FIG. 2. Nerve Board *in situ* Under Frog Sciatic



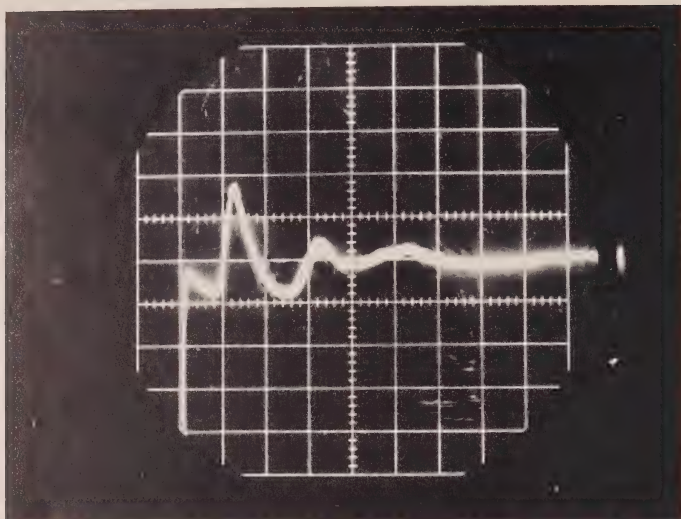


FIG. 3. Oscillogram of Sciatic Action Potential

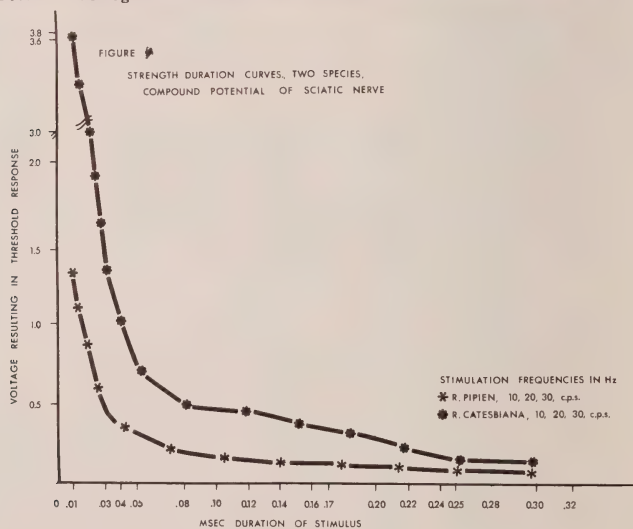


FIG. 4. Strength — Duration Curves, Two Species, Compound Potential of Sciatic Nerve



# Action of Three Steroids on Cartilage Growth in The Chick Embryo

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**SUMMARY**—The action of three steroids, 2 alpha-cyano-ketone, cortisone and pregnenolone on the cartilage growth in the chick embryo were investigated. Embryos injected with 2 alpha-cyano-ketone showed retardation in the skeletal growth which was manifested as micromelia and undersized cervical and mandibular regions as well as fusion of vertebral bodies. Histological examination of the control and experimental jaws and vertebrae did not reveal striking differences. Cortisone-injected embryos exhibited high incidence of malformation in the form of visceral exposure as well as general underdevelopment of

the embryos. Histological investigation of the cortisone-injected embryos did not reveal significant differences from those injected with 2 alpha-cyano-ketone. Pregnenolone evoked a high mortality rate and an appreciable diminution in body size. All three drugs produced dwarfism which could not be attributed to any one specific factor, i.e. diminution rate of matrix formation and/or reduction in cellular proliferation rate. Quantitative studies involving the use of S<sup>35</sup> are currently under investigation in this laboratory.

Alterations in growth and differentiation of the cartilaginous skeleton of chick embryos have been obtained through the action of many drugs such as sulfanilamide and eserine sulfate, (Ancel, 1945); insulin, (Landauer, 1947a); thallium, (Karnofsky, Ridgeway and Patterson, 1950); boric acid, (Landauer, 1952); pilocarpine, (Landauer, 1953); amphetamine and fenmetrazine, (Montuori and Narbaitz, 1963); and thalidomide (Salzgeber and Salaün, 1965).

Several steroid hormones have also been tested on developing chick embryos. Landauer (1947b) demonstrated that adrenal extracts were capable of inhibiting the growth of chick embryos when injected into the yolk sac. Karnofsky, Ridgeway and Patterson (1951) injected cortisone acetate into the yolk sac or the chorio-allantoic membrane of chick embryos of various ages and found that gross malformations of the skeletal system ensued. Buño and Goyena (1955) found that cortisone and hydrocortisone acetates inhibit the growth of chick embryo femur rudiments cultivated on a

natural medium. This fact was later confirmed by Fell and Thomas (1961). Other steroids such as estrogens (Goyena, 1955), progesterone and androgens (Whitehouse and Lash, 1961), have failed to produce similar effects.

Stoll, Fauconau and Maraude (1964) reported that Metopirone,\* an inhibitor of cortisone, produced a retardation of growth in chick embryos. Narbaitz and O'Neal (1968) have reported that 2 alpha-cyano ketone, another inhibitor of cortisone synthesis, produced similar results in that growth of long bones was stunted. The mechanism by which the inhibitors mentioned above produced alterations in cartilage growth has not yet been determined. This study seeks to elucidate this problem.

## MATERIALS AND METHODS

Two hundred and fifty-three White Leghorn embryos were used in our experiments. Eggs were incubated in a forced-draft Bradley incubator. Using the classical window technique, the chorio-allantoic membranes were in-

\*Ciba



jected on the fourth day of incubation. The 2 alpha-cyano-4, 4, 17 alpha-trimethyl-androst-5-ene-17 beta-ol-3-one (2 alpha-cyano-ketone) was previously dissolved in absolute ethanol. Corn oil was then added and the ethanol removed by boiling. The final solution contained 12.5 mg/ml of the drug. Pregnenolone was dissolved in the same way and the final solution had the same concentration.

The cortisone acetate\* was employed in this study as a saline suspension which contained 25 mg/ml.

Eggs were injected in the chorio-allantoic membranes in the doses given in Table I. Control groups for the first two drugs (2 alpha-cyano-ketone and pregnenolone) were injected with amounts of corn oil prepared in absolute ethanol which was subsequently removed by boiling. Noninjected controls were also studied but were not included in Table I.

Eggs were opened on the tenth day and the embryos were removed and fixed in Bouin's solution. Neck length determinations were made by measuring the distance between the pineal organ and the root of both wings. This procedure was executed by stereoscopic examination. The distance between the external auditory meatus and the tip of the beak was used as an index of jaw length.

The cervical region of the vertebral column and the lower jaws of the affected (drug injected) embryos and their corresponding controls were embedded in paraffin following the usual technique.

Serial sections, 6 microns thick, were arranged on coded slides and stained alternately with H and E and PAS. These were read on a Leitz Ortholux microscope equipped with Leica photo-

graphic camera, photomicrographs were taken on Kodachrome IIA film without filters.

## RESULTS

*Control Specimens.* The analysis of normal developmental processes revealed that on the tenth incubation day, chondrification of the vertebra terminated and remnants of the membranous vertebral bodies were no longer observed. These data were also recorded by Lillie (1965). The notochord was noted to run continuously through the center of the vertebral body. Although fibrocartilaginous intervertebral discs have not yet been formed, the intervertebral space was observed to be filled with connective tissue. The latter clearly delimited adjacent vertebral bodies. Two zones were identified in the vertebral bodies; a) the zone of proliferating cartilage and b) the zone of hypertrophic cartilage (Fig. 1). The former which lies near the intervertebral limit consisted of cells which were smaller and closely packed (Fig. 2). On the other hand, the hypertrophic zone is in the center of the prospective vertebral body and in it the cells are larger and widely separated by matrix (Fig. 3). Periodic acid-Schiff reagents which stain the matrix and capsules appeared to be more reactive in the proliferation zone near the intervertebral limit and in the perichondrium (Figs. 1 and 3).

In the chick embryo, the jaw is supported by two paired rudiments: Meckel's and the palato-quadrate cartilages. In this study these elements were fully chondrified in the control specimens. Meckel's cartilages were substantially larger than the palato-quadrate. A zone of membranous ossification was seen in the vicinity of

\*Merck, Sharp and Dohme



the articulation between Meckel's and palato-quadrate cartilages (Fig 4). Ossification in the jaw was generally restricted to this area. The length of the jaw at this age is dependent on the length of the cartilaginous rudiments. As in the case of the vertebral bodies, two zones were identified in cartilages of the jaw; the zone of hypertrophy and the zone of proliferation (Figs. 5 and 6). The cells of the former were not only larger, but the matrix had increased its dimensional aspects (Fig. 5). The proliferation zone was seen in the proximal portion of Meckel's cartilage as well as in the peripheral portions of the palato-quadrate and its processes (Fig. 6). Other areas of these cartilages exhibited moderate hypertrophy. When compared with the activity of the vertebra which anticipate calcification, hypertrophy was found to be lessened.

*Embryos Injected with 2 Alpha-Cyano-Ketone.* Table I demonstrates that 50 per cent of the embryos injected with 2 alpha-cyano-ketone over 1.25 mg exhibited malformations. The latter consisted primarily of retarded growth of skeleton. Although in many embryos alteration in growth was localized to the hind limbs (micromelia), some anatomic components were found to be significantly undersized especially in the cervical and mandibular regions. Table II reveals that the necks of embryos injected with 2 alpha-cyano-ketone were 14 per cent shorter than those of controls. In those embryos injected with the higher dose of the drug, the jaws were appreciably reduced (20 per cent in relation to controls).

The histological study of both vertebrae and jaws indicated that striking differences between experimental embryos and controls did not exist. Both

proliferation and hypertrophic cartilage zones were observed (Figs. 7-11). A comparison of hypertrophic cartilage zones of injected embryos with those of normal controls did not reveal dramatic differences in the amount of matrix present.

An interesting phenomenon was observed relative to the fusion of vertebrae. Figure 7 illustrates the fusion of two such bodies. That the notochord appeared in the histologic section (Fig. 7) indicated that the sectional plane involves the central zone of the body. It was interesting to observe that fusion was complete and that no intervertebral tissue was present.

*Embryos Injected with Cortisone.* Table I illustrates the results obtained after the injection of cortisone. Higher doses effected a very high mortality. On the other hand, lower doses (1.25 mg per egg) produced a relatively high mortality rate in relation to controls but additionally evoked a very high incidence of malformations in the survivors. These malformations were, for the most part, in the form of eviscerations which were due to the underdevelopment of the ventral thoraco-abdominal wall. Most of the embryos were smaller in size than controls. This systemic shortening included a concomitant shortening of the cervical region and jaws. Table II reveals the necks of embryos injected with cortisone between 24 and 35 per cent shorter than those of controls. In those embryos injected with the higher dose, on the other hand, the jaws were diminished in size (34 per cent).

The histological picture of both vertebrae and jaws did not differ from that described for embryos treated with 2 alpha-cyano-ketone. Hypertrophic zones of cartilage (Figs. 12-18) did not exhibit



detectable differences when compared to their control counterparts. Table I also shows that the injection of 1.25 mg of pregnenolone produced a high mortality rate (40 per cent) and a low proportion of malformed embryos. In this case proportionate diminution of body size was observed but no case of evident micromelia could be detected.

### DISCUSSION

The embryonic ages selected for the study of the action of the three drugs on the cartilaginous skeleton appeared to be the most appropriate. For example, on the fourth day of incubation which was the time selected for injection, the primordial of the prospective vertebrae as well as Meckel's cartilage were in the membranous stage. Thus, the respective cartilages had not initiated differentiation. The drugs probably continued acting during the 6-day experimental period. Relative to the cortisone this was substantiated by the work of Karnofsky *et al* (1951) who demonstrated that cortisone exerted its action after the eighth or tenth day even when injected during the first days of incubation or even prior to incubation. Since 2 alpha-cyano-ketone was carried and injected as an oily solution, absorption was slow and continuous. Goldman, Bongiovanni and Yakovac (1966) demonstrated this slow and persistent action of the same drug in the embryos investigated by them.

On the tenth day, when embryos were dissected, formation of cartilage was found to be completed both in the vertebra and in the jaw skeletal elements. Since the proliferation and hypertrophy zones were clearly distinguishable, the analysis of the action of the various agents on these two processes was possible.

The action of cortisone on skeletal growth was first observed by Karnofsky, *et al* (1951). These investigators noted distinct inhibition of skeletal growth in the treated embryos. Buño and Goyena (1955) working with the femora of seven-day chick embryos cultured in a natural medium found that cortisone stopped the growth of the rudiments. These investigators concluded that the action was due to a diminished proliferation rate of cartilage cells. Sobel and Freund (1958) confirmed their finding relative to growth but maintained that it was due to a lack of hypertrophy in the diaphysal chondrocytes. Fell and Thomas (1961), on the other hand, who confirmed the lack of hypertrophy of those cells, believed that the most important factor was the inhibition of matrix formation. Confirming the latter hypothesis, Lash and Whitehouse (1961) and Whitehouse and Lash (1961) observed that in cartilage developed *in vitro* from chick somites, the cortisone inhibited matrix formation by preventing the sulphation of chondroitin to form chondroitin sulphate.

Medoff (1967) who studied the synthesis of chondroitin sulphate and identified several enzymes in developing chick cartilage, concluded that this is the most important biochemical event related to cartilage growth.

The embryos selected by the investigators in this laboratory for histological study were those in which the cartilage dwarfing was most prominent (35 per cent or more). If differences in matrix accumulation were the only cause of differential growth, then anticipated density of cellular elements should be significantly higher in the injected embryos. Since differences in cellular density between injected and control



embryos were not appreciable it is felt that more than one factor must be involved in the curtailment of cartilage length. Definitive conclusion can only be achieved after quantitative studies involving S<sup>35</sup> incorporation in the cartilage matrix have been made. This aspect is currently being investigated in this laboratory.

The action of cortisone on chondroitin sulphation has already been well established (Lash and Whitehouse, 1961 and Whitehouse and Lash, 1961), while the precise mechanism of action of the 2 alpha-cyano-ketone is unresolved. The fact that this substance is an inhibitor of cortisone synthesis would suggest that its action may be an indirect one such as interference with cortisone action. If this were the *modus operandi*, one would expect that action of 2 alpha-cyano-ketone to be opposite to that of cortisone and that dwarfing should not occur. This is incompatible with our results. It is interesting to note that at the age in which the 2 alpha-cyano-ketone is injected, the adrenal glands have not yet

differentiated and the 3 beta-hydroxysteroid dehydrogenase enzyme, on which the 2 alpha-cyano-ketone is presumed to act has not appeared (Decoud, Pedernera and Narbaitz, 1964; Narbaitz and Kolodny, 1964). On the basis, we strongly believe that the action of the 2 alpha-cyano-ketone is a direct one on the cartilage..

The 2 alpha-cyano-ketone inactivates the 3 beta-hydroxysteroid dehydrogenase by acting as an analog of its substrate, the pregnenolone. However, our results show that the action of 2 alpha-cyano-ketone and pregnenolone on the chick embryo differs both quantitatively and qualitatively. It appears probable that the cyano group introduced to the trimethyl- androst-5-ene-17 beta-ol-3-one may be primarily responsible for the differences between the pregnenolone of the 2 alpha-cyano-ketone action.

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TABLE I  
RESULTS OBTAINED AFTER THE INJECTION OF STEROIDS

| <i>Experiment</i> | <i>Drug</i>  | <i>Dose (mg./egg)</i> | <i># Embryos</i> | <i>Per cent Mortality</i> | <i>Per cent Malformation</i> |
|-------------------|--------------|-----------------------|------------------|---------------------------|------------------------------|
| 1                 | Cyano-ketone | 1.25                  | 50               | 20                        | 50                           |
| 2                 | Cyano-ketone | 2.50                  | 20               | 40                        | 95                           |
| 3                 | Oil          | (control)             | 30               | 4                         | —                            |
| 4                 | Cortis.      | 1.25                  | 64               | 39                        | 100                          |
| 5                 | Cortis.      | 2.50                  | 28               | 78                        | 100                          |
| 6                 | Saline       | (control)             | 31               | 19                        | —                            |
| 7                 | Pregnen.     | 1.25                  | 30               | 33                        | 30                           |



**TABLE II**  
**LENGTH OF NECKS (\*) AND JAWS (\*\*\*) OF NORMAL AND INJECTED EMBRYOS**

|      | <i>Control</i> | <i>Cortisone</i><br><i>Low dose</i> | <i>High dose</i>   | <i>2-Alpha-Cyano-Ketone</i><br><i>Low dose</i> | <i>High dose</i>   |
|------|----------------|-------------------------------------|--------------------|--|--------------------|
| Neck | 9.35 mm.       | 7.18 mm.<br>(-24%)                  | 6.5 mm.<br>(-35%)  | 8.12 mm.<br>(-14%)                             | 8.33 mm.<br>(-14%) |
| Jaw  | 10.7 mm.       | 10.33 mm.<br>=                      | 7.12 mm.<br>(-34%) | 10.75 mm.<br>=                                 | 8.56 mm.<br>(-20%) |

(\*) distance between pineal organ viewed by transparency and root of wings.  
 (\*\*\*) distance between external auditory meatus and tip of beak.

PLATE I  
 NORMAL CERVICAL VERTEBRAE

- FIG. 1. Cervical vertebral body. Proliferation (P) and hypertrophic (H) zones are seen. PAS stain x 80.  
 FIG. 2. Proliferation zone of the same body (P). H and E stain. x 200.  
 FIG. 3. Hypertrophic zone (H). Note the intense PAS stain on the perichondrium. PAS stain. x 200.

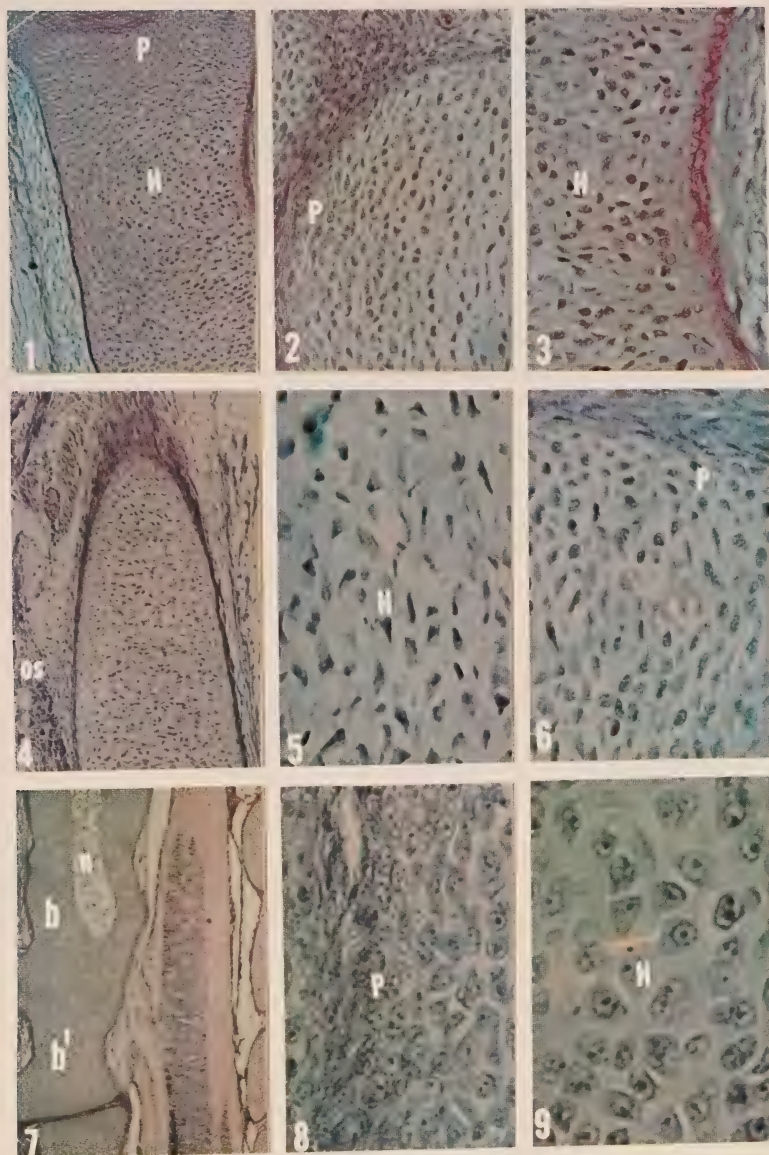
NORMAL JAW CARTILAGE

- FIG. 4. Dorsal end of Meckel's cartilage. Parachondral ossification is shown in the surrounding tissue (os.) H and E stain. x 80.  
 FIG. 5. Hypertrophic (H) zone in the same cartilage. H and E stain. x 320.  
 FIG. 6. Proliferation (P) zone in the same cartilage. H and E stain. x 320.

CERVICAL VERTEBRAE OF EMBRYOS  
 INJECTED WITH 2-ALPHA-CYANO-KETONE

- FIG. 7. Two vertebral bodies (b, b') appear fused. Notochord has been affected by section (n). H and E stain. x 30.  
 FIG. 8. Higher magnification of the same section. Proliferation zone (P). H and E stain. x 480.  
 FIG. 9. Same section. Hypertrophic zone (H). H and E stain. x 480.







## PLATE II

JAW CARTILAGE OF EMBRYOS  
INJECTED WITH 2-ALPHA-CYANO-KETONE

- FIG. 10. Dorsal end of Meckel's cartilage. H and E stain. x 80.  
FIG. 11. Higher magnification of the same section. Hypertrophic zone. H and E stain. x 320.

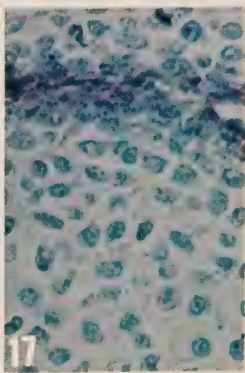
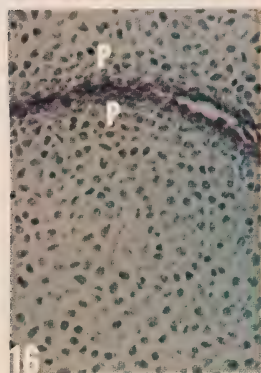
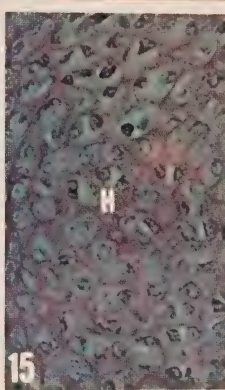
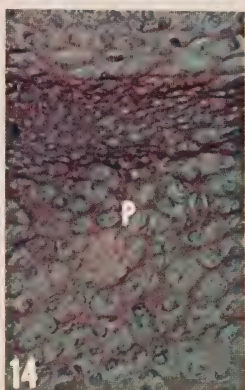
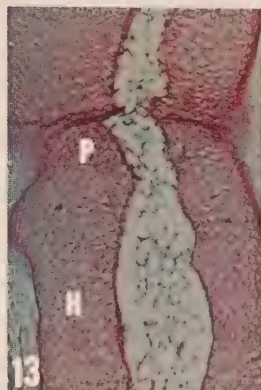
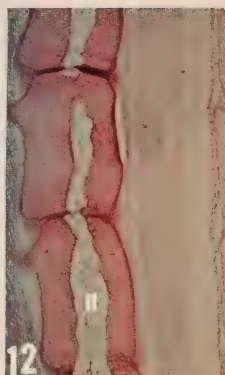
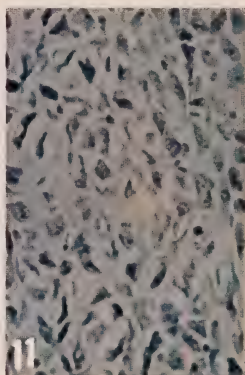
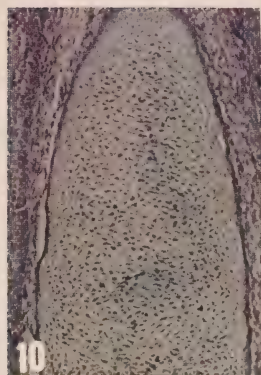
CERVICAL VERTEBRAE OF EMBRYOS  
INJECTED WITH CORTISONE

- FIG. 12. Vertebral bodies pierced by the notochord (n). PAS stain. x 30.  
FIG. 13. Higher magnification of the same section. Proliferation (P) and hypertrophic (H) zones are shown. PAS stain. x 80.  
FIG. 14. Higher magnification of the same section. Proliferation (P) zone. PAS stain. x 320.  
FIG. 15. Same section. Hypertrophic (H) zone. PAS stain. x 230.

JAW CARTILAGE OF EMBRYOS  
INJECTED WITH CORTISONE

- FIG. 16. Meckel's and palato-quadrate cartilages. Proliferation (P) zones of both cartilages are seen near the joint. H and E stain. x 200.  
FIG. 17. The same region shown with higher magnification. H and E stain. x 480.  
FIG. 18. Hypertrophic (H) zone of Meckel's cartilage. PAS stain. x 480.







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# Format Recommendations For Contributors

## I. GENERAL INFORMATION

Two complete manuscripts with illustrations should be sent to the Editor, Journal, Baltimore College of Dental Surgery, University of Maryland School of Dentistry, Baltimore, Maryland 21201. The articles which are submitted for publication are expected to follow the format suggested below. It is assumed that the papers are based on original data and that they have not been published or previously submitted for publication in other Journals.

## II. TEXT SECTIONS

Each article should be sequentially arranged as follows:

- A. Summary
- B. Introduction
- C. Materials and Methods
- D. Results
- E. Discussion
- F. Acknowledgements
- G. References

## III. TEXT REFERENCES

References cited in the text should include the author(s) last name and publication year as in "Doe and Brown (1966)". Multiple authorship (more than 2) is initially cited *in toto*. e.g. Doe, Brown and White (1966). Subsequent reference to the multiple authorship (more than 2) should be made as: Doe, *et al.*, (1966).

## IV. BIBLIOGRAPHIC REFERENCE

A. References cited bibliographically should be alphabetically and sequentially arranged as follows: author(s), year, article, title, Journal (Index Medicus preferred), volume and complete page coverage. Example:

Doe, J. J., Brown, D. M. and White, S. T. 1966. Fibrillogenesis in the dental sac. *The Journal* 21: 55-63.

B. Author(s) having two or more publications in a given year should be designated as *a*, *b*, etc. Examples:

Doe, S. S. and Brown, D. M. 1966a. Heterochromatin in oral epithelial cells. *The Journal* 20: 73-85.

——— 1966b. Cytochemical features of oral epithelium. *The Journal* 20: 98-110.

C. Book or monograph citations are arranged as:

Doe, S. S. and Brown, D. M. 1966. Inheritance and Development (Edited by White, S. T.) Chapt. 1, p. 16. University Press, Baltimore.

D. References which are in press or are personal communications are given as follows:

Doe, J. J. 1966. Fibrillogenesis in the dental sac. *The Journal* (in press).

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## V. ILLUSTRATIONS, LEGENDS AND TABLES

A. All illustrative material excluding tables should be indicated as figures (Fig. 0), and submitted as mounted glossy prints. The illustrations singly or grouped should not exceed 5" x 7". Labels, lead lines, arrows or other designations should be indicated on the print and each illustration should be numbered consecutively. The back of the illustration should bear the following information:

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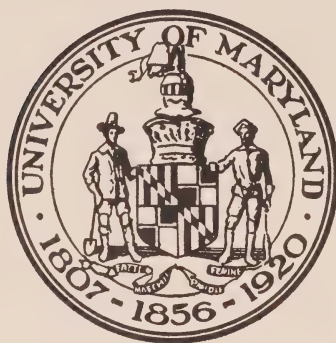
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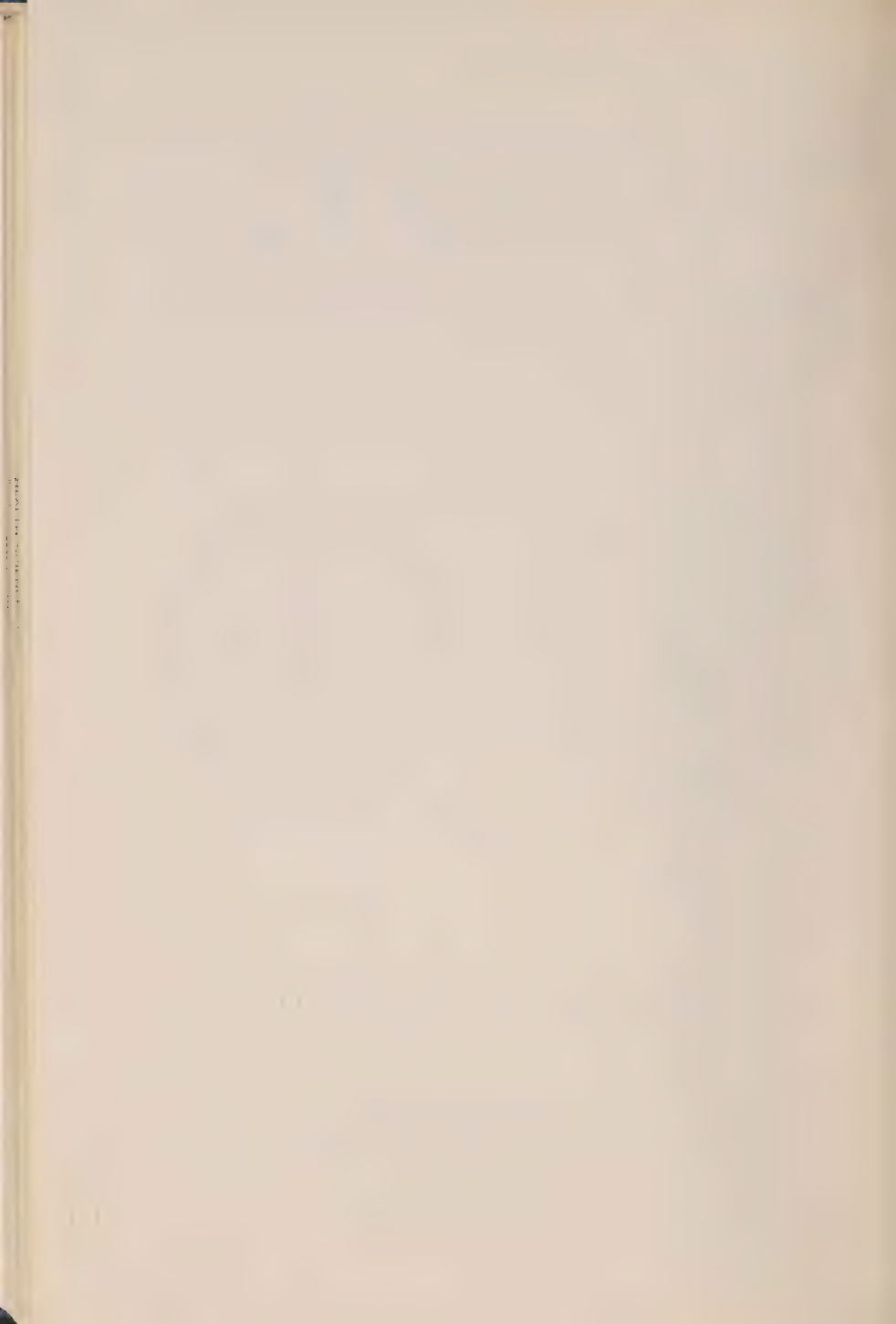
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## Odyssey of a Profession\*

SEYMOUR J. KRESHOVER, D.D.S., M.D., Ph.D.<sup>1</sup>

Today marks a period of important transition for you—a time of very special change.

In a broader sense, change has always been with us—as certain as the proverbial death and taxes. But in recent years it has accelerated at an almost cataclysmic rate—so much so that such terms as “forces of change” and “winds of change” have become clichés. We are all caught up in this vortex. But for you, as a new generation of health professionals, the rapidly changing scene imposes special obligations as well as opportunities.

Each generation has had its own Excalibur to wrest from the stone. Even the psalmist tell us:

Each age its solemn task may claim but once  
Make each one nobler, stronger than the last.

But no one can deny the uniqueness of the situation which confronts you today. Only in this generation—would you believe—are reservations being booked for flights to the moon. The odyssey that I would speak to you about today is not one of space but an odyssey of the spirit, as you venture forth as members of your community and profession to cope with problems long neglected that now compel action.

The over-riding national concerns that have forcefully surfaced in past months need no reminder. In the civic arena, by

interest, training, sensitivity, and commitment, you can help to heal the rifts, bind the wounds, and bring wholeness to the body politic. Because of your greater social awareness and widened intellectual horizons, you can respond more positively than the graduate of yesteryear. But let us limit our discussion to your more specialized professional contributions.

Some of the root developments that will affect your professional lives have been well summarized by NIH Director James Shannon. The first of these developments is the advancement of the biomedical sciences to the point where powerful means of affecting the health and well-being of man have been discovered. Second, the biomedical sciences are well on their way to providing the scientific base for a fundamental reorientation of Western medicine, from previous preoccupation with disease to the direct study of complicated intellectual and emotional as well as biological processes. Such advances can lead to fuller development of human potential, as well as prevention of serious malfunction due to disease. Third, advancement of knowledge for the improvement of

\*Presented at the Honors Convocation, School of Dentistry, University of Maryland, Baltimore, Maryland, on Friday, June 7, 1968.

<sup>1</sup>Dr. Kreshover, Assistant Surgeon General, U. S. Public Health Service is Director, National Institute of Dental Research, National Institutes of Health, Bethesda, Maryland.



health is now recognized as a national concern. Today, people believe that health care is a right rather than a privilege.

Buttressed by such factors as a growing population and rising levels of income and education, these developments have set the stage for unprecedented demands for health care. They have set in motion a chain of events ranging from specific legislation to reassessments of patterns of health care and the education of health professionals.

You are particularly endowed to cope creatively with these events. First, you are members of a profession which has long advocated public-spirited measures, such as fluoridation, which appear to strike at your own self-interest. Second, your profession has led the way in the use of auxiliaries, a critical concern in the whole health field today. Third, the scientific and sociologic components of your modern-day training stamp you as a new breed of dentist. Your outlook and approach differ from that of the graduate of 20 years ago.

Your generation is more diagnostically oriented, with a greater concern for the totality of oral disease, as contrasted with former preoccupations with the teeth alone. You are much more at home in a hospital. About one of every eight or nine current graduates will take a hospital residency or internship, as contrasted with possibly one of fifty some 20 years ago; and you also tend more to group practice. This responsiveness to change will serve you in good stead in seeking further innovations to meet the pressures of increased demand for services. The characteristics and dimensions of these problems are well known to you.

Nevertheless, permit me to delineate a few specific trends. Trade unions will increase their bargaining for comprehensive benefits to cover the entire spectrum of health care services. A dramatic increase in broad health insurance coverage may also be anticipated. A leading insurance spokesman recently predicted that 80 percent of all medical costs, including dental care, will be covered by prepayment programs in the early 1970's. Medicare and Medicaid may be expected to have an impact on dental care. Attempts are now being made to expand Medicare benefits to include dental service during hospitalization. Some idea of the magnitude of this potential demand for dental service may be obtained from the fact that this very year an estimated 19.2 million aged individuals became eligible for hospital insurance under Medicare.

Dentistry will also become involved in the new "Partnership for Health" program, which calls for all the health professionals to participate at the local level in planning for health care. It is significant that of 47 states which recently submitted to the Surgeon General a list of their most urgent health problems, 36 listed dentistry as one of their top five priorities.

As a result of various societal forces, dental demand is expected to increase 50 to 75 percent by 1975. Only one-fifth to one-third of this increased demand can be met by the projected increase in the number of dentists. The number of auxiliary personnel will also be inadequate.

There is obviously no single, simple solution to this problem. But one conclusion is inescapable: we cannot continue doing business in the same old



familiar way because it is more comfortable. Ultimately, we may borrow a leaf from our medical colleagues and give the individual practitioner the responsibility of delegating duties to auxiliaries. Since 1961, Federal agencies and dental schools have been studying the problem of what procedures can be delegated to dental assistants, hygienists, and laboratory technicians. Eventually, their findings will accelerate the transfer of selected, lesser professional duties from the dentist to his auxiliaries. The judicious delegation of duties to trained subordinates lies at the heart of the new patterns that must evolve to meet growing demands for health care. This need permeates the whole health world—a world which has been characterized as being afflicted with a wistful itch for yesterday.

A greater mobility of health professionals, facilitated by universal reciprocity, and, even more importantly, the assurance of uniformly high levels of quality, must also be part of tomorrow's health patterns. The Federation of State Medical Examiners has taken the lead in adopting a single U. S. licensing test. Dentistry has recently made an encouraging move in that direction by instituting a simultaneous 14-state regional licensing examination, scheduled for 1969.

Mechanisms of continuing education and periodic testing to assure the maintenance of up-to-date high standards of care represent still another concern to which you as professionals will have to address yourselves. While it is not so easy to point a finger at discrepancies in dental care, as can sometimes be seen in different levels of medical care given in teaching and non-teaching hospitals,

nevertheless, as time goes on, the public will be more concerned about the quality of all health care.

A very special challenge confronts dentistry in meeting the public's desire for the convenience of one-stop health services and the assurance of unfragmented care. It is perhaps a safe prediction that most of the future education and practice in clinical dentistry will be centered in the hospital, where the relation of dental care to total health can be graphically demonstrated.

The priorities set by society usually determine the urgency for any course of action. Interest in a children's dental health program, long espoused by the dental profession, reached a high point last year with the enactment of legislation by the Congress. However, because of the tight financial situation, the proposed budget of \$5 million for the first year pilot project was reduced to \$1 million. The profession needs to move with the greatest haste to be ready for the tremendous demands which will be generated by the full flowering of this program.

As a university-based profession, dentistry shares in the university's increasing assumption of social responsibilities. In response to these demands, centers of higher learning, like many parts of the Federal establishment, are finding that their pursuit of new knowledge is increasingly in competition with a concern for the public welfare. This growth of interest in public service extends significantly beyond the traditional role of the American university in acquiring new knowledge through research and transmitting this knowledge through teaching.

The partnership between the uni-



versities and the Federal government, originally forged to serve the national need for biomedical research and to aid the growth of the health professions, will become increasingly important in meeting the total complex of demands being imposed upon both the universities and the profession. Today it is not only necessary that universities and their health centers provide adequate numbers of qualified health professionals and auxiliary workers. They must also achieve a proper balance among education, service, and research. Finally, they must engage themselves in all aspects of disease prevention and health care—pursuing not only the traditional types of biomedical research, but also studies and experiments in the delivery of services. Hospital systems must be improved, new ancillary cadres must be developed, and better methods for continuing professional education will be sorely needed.

To help the university meet these responsibilities, new Federal programs of support are being explored. As part of this reassessment, the concept of direct support for the core functions of the medical school is emerging. It has been suggested that, if the schools would identify their essential, or core, activities, Federal subsidization of the educational function may be a distinct possibility. Adequate provision for education *per se* would promote balance and stability in the universities. While the problem of balance has not been as severe in dental schools, any program to strengthen the overall base of the university would have a beneficial impact on dentistry as well.

As you may know, within the past couple of months, the science and edu-

cation programs of the Public Health Service were joined under a broadened authority for the National Institutes of Health. Placement of their management within a single operational unit recognizes the intimate interrelation between biomedical research and the education of the health professions. While the details have still to be worked out, I believe that this alignment of responsibilities will improve the course of both dental research and education.

Today, the Federal investment in health is \$15.6 billion—three times what was spent five years ago. Medicare and Medicaid have accounted for nearly 80 percent of the growth of the Federal health dollar. Of the nearly \$50 billion spent for health in this country, one of every four dollars is from the Federal Government.

One of the new growth programs that may be expected to take an increasingly larger share of the Federal contribution is research on the organization and delivery of health care. It has been predicted that within ten years this budget will equal the \$1.2 billion currently being spent by NIH for biomedical research and research training. The NIH budget, I might add, accounts for 35 percent of the total expenditure on biomedical research in this country.

In the biomedical field, the role of fundamental research has now been more firmly established as part of a continuum. Applied research always flows from the findings of the basic scientist. But while undirected basic biomedical research will continue to grow, a greater emphasis will be placed on directed or targeted research.

At the National Institute of Dental



Research, two of our current targeted research areas are caries and the development of restorative materials. There now exists a sufficiently firm scientific base in these areas to permit us to move forward in selected programs with a reasonable hope for success.

Significant reductions in tooth decay, in addition to those accomplished through fluoridation, are anticipated now that long-term studies have shown the essential role of specific strains of streptococci in initiating the caries lesion.

These organisms adhere tenaciously to the enamel surface, prefer a sucrose type of sugar for growth, and produce large amounts of acid. The ability of these bacteria to adhere to the tooth surface is enhanced by their production of dextran, a type of polysaccharide. This substance is secreted as a gummy coating which forms the matrix of the bacterial plaque deposits.

NIDR scientists, in collaboration with investigators at Merck Sharp and Dohme Research Laboratories, recently isolated an enzyme, dextranase, which dissolves the dextran produced by the cariogenic streptococci. Caries has been almost completely prevented in hamsters by incorporating small amounts of this enzyme in their food and water. If these preliminary results in animal trials are borne out in humans, this work will represent one of the most significant new approaches to preventive dentistry in recent years.

Pending the eradication of caries, the development of a truly adhesive restorative material is a practical necessity. It perhaps goes without saying that improved biomaterials are also needed for victims of oral-facial disfigurement fol-

lowing not only disease but extensive surgery and trauma as well. The rewards of a successful effort in this field of research would indeed be immeasurable in terms of dollar-cost saving and patient-doctor time.

Research on other oral disorders, such as periodontal disease, continues at a more basic level. Within the next decade, the role of various factors in these complex diseases should be better delineated, leading to more effective management and ultimate prevention.

As the National Institute of Dental Research observes its 20th Anniversary this month, I can assure you that research will continue to shape dental education and practice and that in your professional lifetime you will have the satisfaction of seeing many of our persistent enemies virtually conquered. Research advances will also help you to meet in large part the heavy demands for service which you will face and to make your maximum professional contribution to the betterment of human life.

At the second annual commencement of the Baltimore College of Dental Surgery in 1842, Dr. W. R. Handy urged the graduates—and I quote—"to act in harmony with and under the especial guidance of the great fundamental principles of doing good, and supplying everywhere, as far as in your power, the natural wants of mankind." Today, one hundred and twenty-six years later—in the midst of great turbulence—this injunction has even greater relevance.

You are about to begin a professional odyssey of greater dimensions and complexity than your founding fathers may have ever foreseen. While they planned



well, and their succeeding generations of leaders added much to the vitality of the structure, you, as products of this great university, are especially well endowed for this odyssey, and I wish you Godspeed as you move on.



# Facilities for the University of Maryland Dental Health Center

by

JOHN J. SALLEY, D.D.S., Ph.D.

JAMES H. STEPHENSON, B.S., B. Arch., A.I.A.

*"There are old ways of doing things that must be discarded  
and old values that must be preserved . . ." John W. Gardner*

In the academic community it is generally accepted that transition of a school or college from one environment to another should be accompanied by a sequential method of programming which will allow the faculty the opportunity for updating, innovation and alteration of existing patterns of education. In the construction of physical facilities for academic purposes several definite stages of planning may be identified. These are the development of a broad set of goals or objectives for the school or college; the formation of an academic program which will meet these objectives; planning of space, equipment and facilities needs to accomplish the program and its objectives; construction; implementation of the new or modified academic program; and, finally, evaluation of overall effectiveness.

In the December, 1966 issue of the Journal of the Baltimore College of Dental Surgery, a broad program description for a University-oriented Dental Health Center was presented. Educational objectives and philosophy, curriculum design, and teaching and research methodology in this Center represent the aggregate thinking of faculty planners in the School of Dentistry at the University of Maryland and embrace the first two stages of programming for a

new and expanded physical facility for dental education on the Baltimore City Campus of the University. With agreement by the general faculty on the Dental Health Center concept, the next stage of programming, namely, actual planning of the physical facilities to meet program needs, was initiated. At this writing the construction phase of the program is now in progress. It is the purpose of this paper to describe the physical facilities for the Dental Health Center which have been planned and which are now in the active stage of construction in order that the reader may gain some better insight into the general approach to dental education which has been designed and adopted by the University of Maryland dental faculty.

In the program description referred to above, the faculty has stated that, "... the dedicated and guiding purpose of the School of Dentistry is the firm establishment of an academic environment founded on three basic aims: the highest quality of instruction in dental art and science; an atmosphere of investigative spirit; and an abiding attention to the service obligations incumbent on the dental profession." These fundamental University goals—teaching, research and service—have been uppermost in planning physical facilities, and a resume of



the space which will house the Dental Health Center must be examined with the tripartite function of the University kept in clear perspective at all times.

To accomplish the teaching function in the Center will require an array of facilities which vary from a lecture hall to a self-instruction center where the student will have the opportunity to learn previously programmed material at his own pace. The Center must have sufficient versatility to allow the dental faculty to transmit knowledge through the medium of television to practitioners of the health sciences who are remote from the Dental Health Center, as well as conduct small group seminars with undergraduates in a conference room setting. With respect to space needs to conduct a complete program of research, these must include facilities which range from individual laboratories to animal facilities to those which are outside of the Dental Health Center proper, e.g. the Health Sciences Library and the Computer Center. Those facilities which will allow the development of service programs include general practice and specialty clinics but also extend beyond the four walls of the Dental Health Center. The growing importance of dental facilities in the University of Maryland Hospital, related health facilities in the City of Baltimore and in the State are parts of a complex which are absolute necessities in the formulation of a modern program of dental education. Hopefully, it is obvious then that the Dental Health Center as a tangible physical facility will be but a nucleus in the educational milieu requisite to the preparation of young men and women for meaningful and productive careers in the dental profession.

Within the Dental Health Center

itself every attempt has been made to coordinate and integrate related activities, bearing in mind, however, the interrelationships which must exist between the teaching function, the research function and the service function. The floor-by-floor summary which follows will present some of the highlights with respect to design factors, utility and flexibility of the Dental Health Center building. This structure will consist of a ground floor which is partially below grade, a first floor at grade level, and four upper floors. It is structurally designed for two additional floors plus lateral expansion to the east and west sides. The ground, first and third floors will house treatment areas and, therefore, are designated as public. The major portions of the ground, first, second, third and fifth floors are devoted to teaching activities, while the fourth and partially the third and fifth floors will house research and administrative facilities.

*Ground Floor.* Major student facilities will be found on this floor (Fig. 1). A student lounge, space for a self-instruction center and historical displays as well as locker and toilet facilities for both male and female students are located off a central student corridor. Student access to this area may be by one of five stairways and two passenger elevators. A 48-chair clinic is on the south side of the floor and is designated as a special preventive dentistry clinic where all regularly admitted patients will be seen after the initial admissions visit. Dental students and student hygienists working together will introduce each new patient to principles and techniques of prevention and education in home care procedures in the Preventive Dentistry Clinic. Multidisciplinary



laboratory spaces are provided for the preclinical courses in the dental hygiene and dental assisting programs on this floor. The south side of the building houses the visual aids section containing a closed circuit television studio, control room, photography and photomicrography rooms and supporting areas. The CCTV network is envisioned as covering essentially the entire building with conduits being installed at the time of initial construction. Television transmission and reception points will be

located on all floors in addition to being placed in all lecture, laboratory, clinic and conference room spaces. With a wide TV network interesting clinical cases can be viewed in all student occupied areas on short notice with a minimum of technical difficulties. In addition, TV will be channelled to patient waiting areas so that in the course of a day audio-visual material relative to oral health education can be televised. Other assignable spaces on the ground floor include a shop for

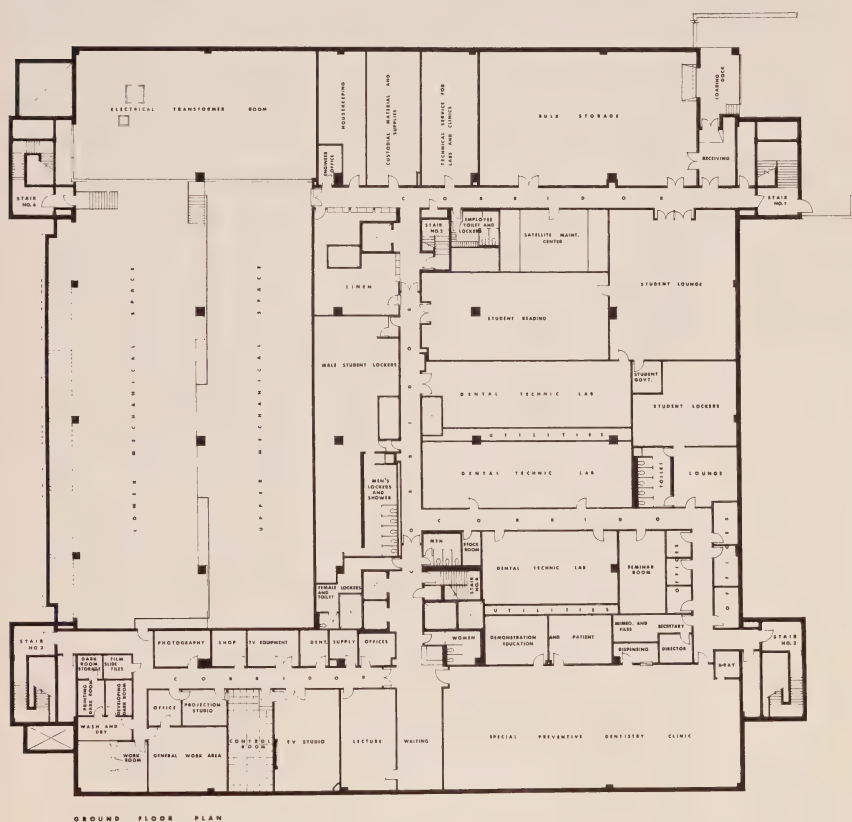


FIGURE 1







registered and admitted, patients will be routed to the oral diagnosis clinic for initial interview and a screening examination. Those patients requiring counsel with the social work staff may be directed to that area either directly from the registration desk or from the oral diagnosis clinic. Included in the diagnosis clinic is a suite of rooms for a physician and medical technologist where further medical evaluation and indicated laboratory tests will be performed. Immediately adjacent to the diagnosis clinic and connected to it through the film viewing room is the radiology clinic. Single film exposures for emergency patients and full mouth series for regular patients, including panoramic and cephalometric films where indicated, will be performed here. Regularly admitted

patients will be appointed to this clinic after the initial examination, this requiring a small waiting room which is directly across the corridor. Dental students, dental hygiene and dental assisting students will be assigned to these two clinics in blocks. Since a large number of emergency patients seeking relief of pain only and requiring predominantly oral surgery procedures are seen in the present dental clinic, the oral surgery clinic is adjacent to the diagnosis and radiology area. A regularly admitted patient requiring surgery will be appointed, and whenever possible, will have the procedure performed by the dental student to whom he is assigned for comprehensive dental care. The diagnosis, radiology and oral surgery areas are illustrated in *Figure 3*. *Figure*



FIGURE 3



4 shows a community dentistry clinic for handicapped patients located at the southeast corner of the first floor. Patients seen in this clinic may be in rollers, therefore the clinic is adjacent to an entrance provided with a ramp. Treatment rooms will have hospital-width doors and the clinic will have its own reception space so that its patients will have privacy. The major portion of

the first floor is occupied by two 128-cubicle general practice clinics separated by central clinic services (dispensing, cashier, etc.). There will be four teaching modules in each of these clinics and each module will contain 32 cubicles. Two adjacent modules are shown in enlarged fashion in *Figure 5*. Dental students will be permanently assigned to cubicles and will remain in the assigned

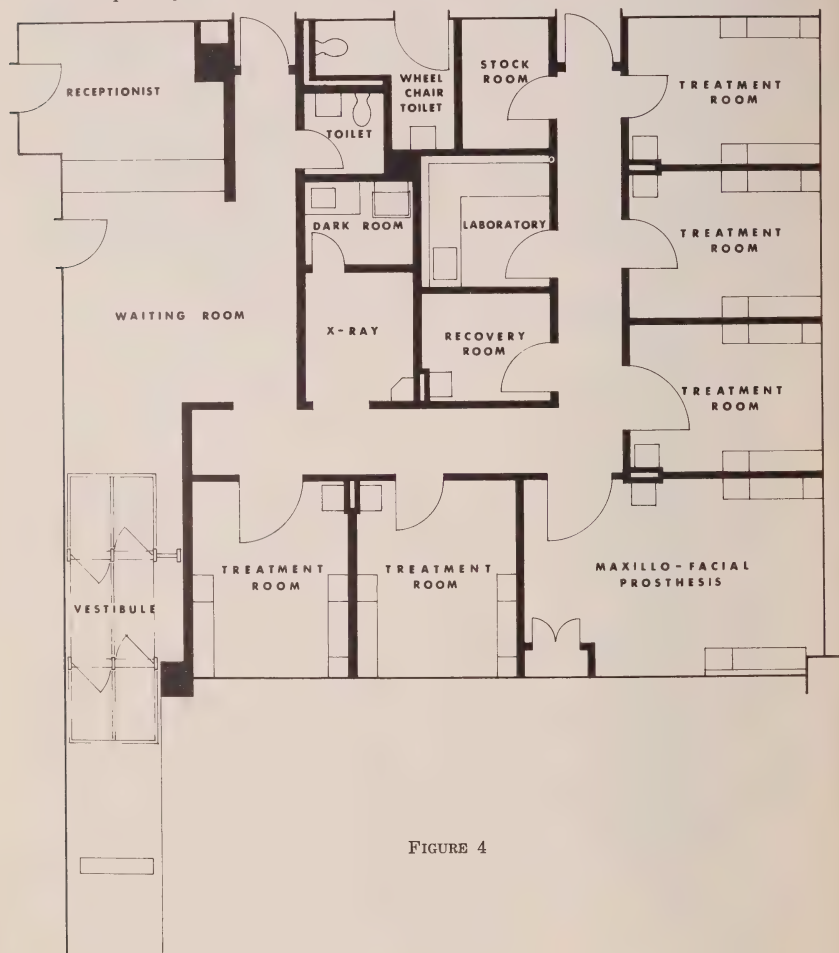


FIGURE 4



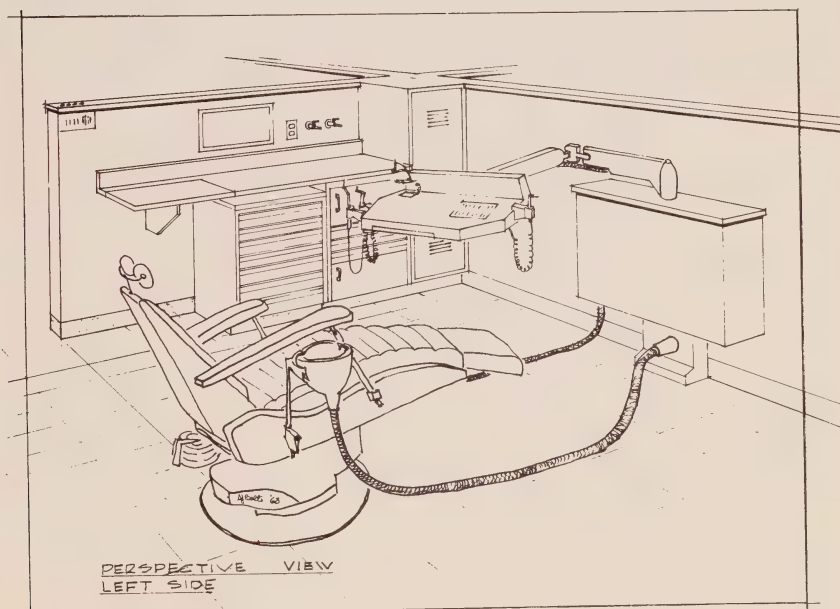
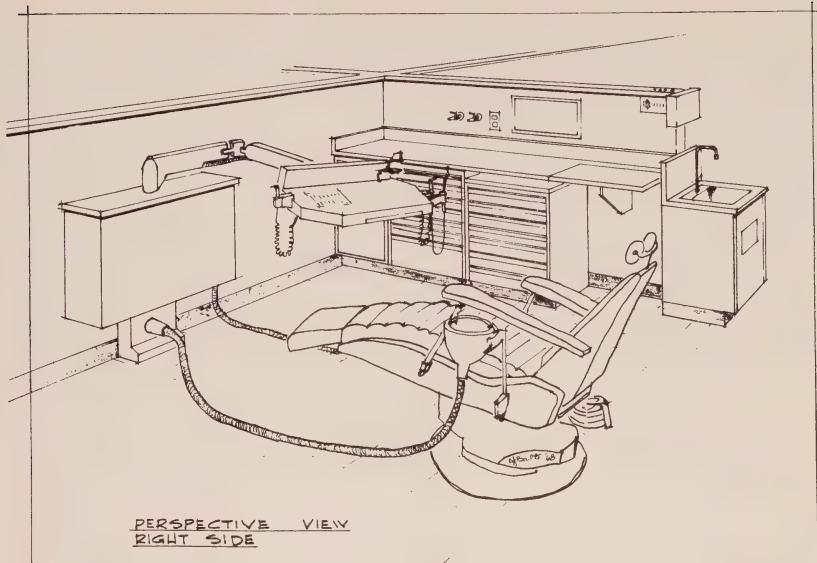


FIGURE 5



cubicle for the third and fourth years since the junior and senior clinics are identical in every respect. In the traditional departmentalized dental school clinic a dental student expends between 35 and 40% of his two clinical years moving from one departmental area to another and in other unproductive activities; by permanent assignment of a student to a cubicle this unnecessary movement and lack of productivity can be minimized. Cubicles will be separated by partitions 54 inches high

and will be 7 by 9 feet in size to allow the student to work with a chairside assistant. Typical cubicles are shown in *Figure 6*.

The scrub area and service laboratories will be open to all students in the appropriate module thus eliminating the need for large technic laboratory space for junior and senior students. Many prosthodontic laboratory procedures will be referred to dental laboratory technicians so that the service laboratories will be used for pouring impressions,

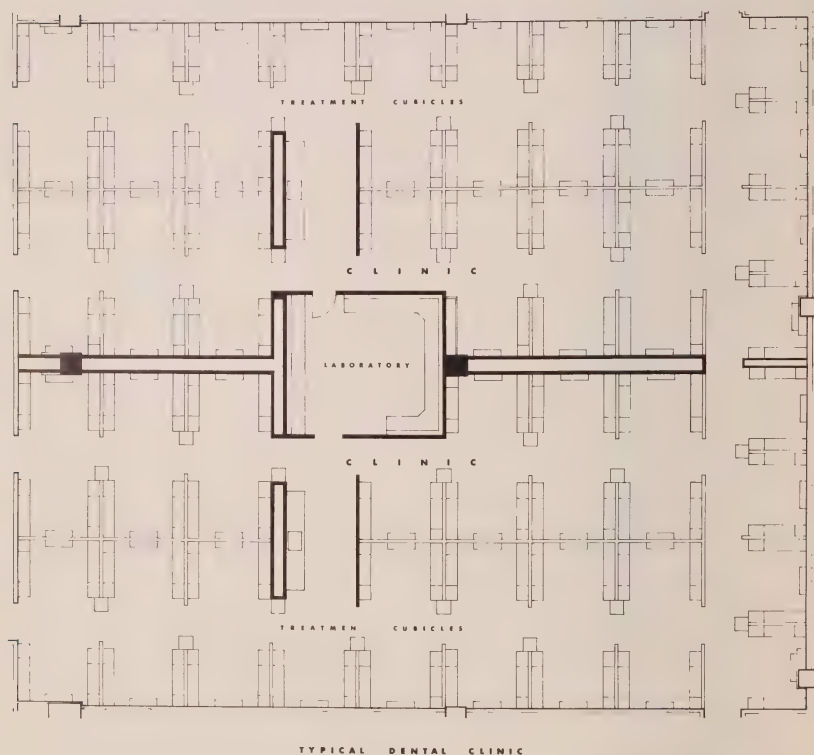


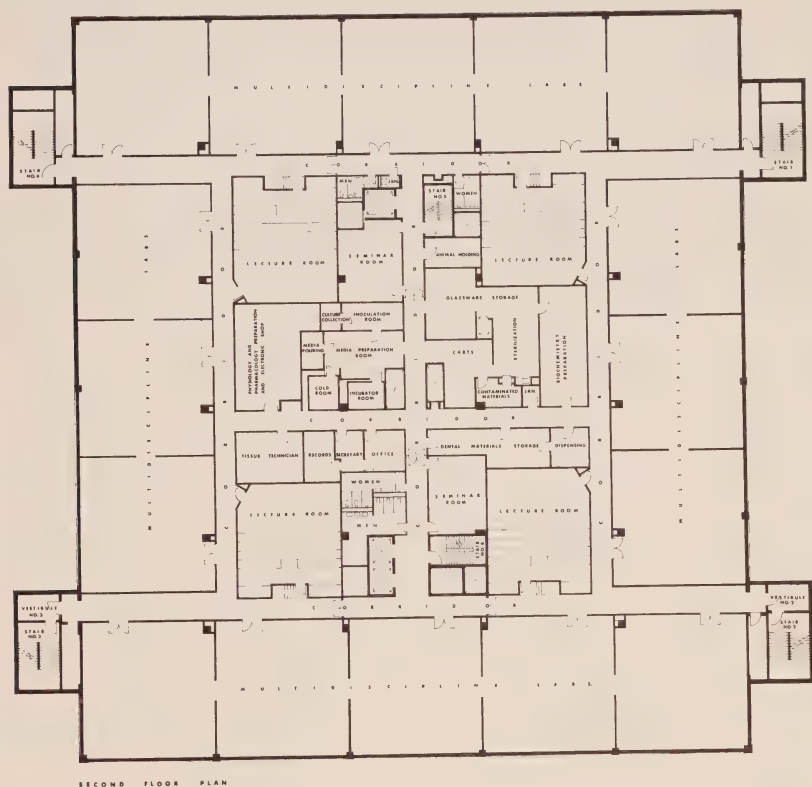
FIGURE 6



casting, soldering, etc. Whenever possible, these laboratories will be staffed by dental laboratory technicians so that dental students can learn to work closely with this important auxiliary.

Through scheduling, the same cubicles which are assigned to junior and senior students will serve the freshman and sophomore students when they are given clinical instruction. Since the building does not have internal weight-bearing walls, the partitions between modules may be removed if this is ever indicated by changes in the teaching program.

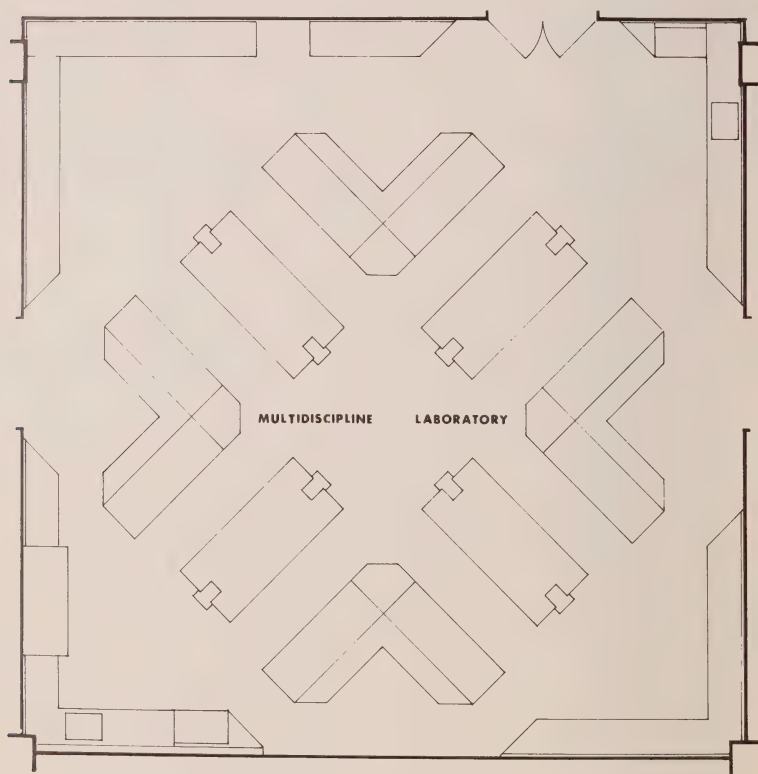
*Second Floor.* This floor will house 16 multidiscipline teaching laboratories, lecture halls, seminar rooms and central laboratory services (Fig. 7). Each multidiscipline laboratory will accommodate 16 students; there will be 8 laboratories for freshmen and 8 for sophomores. Again, identity of design will allow assignment of a class to these spaces for two years thus reducing moving. The Dental Health Center program calls for utilization of the multidiscipline laboratory for all laboratory teaching except gross anatomy. These rooms, the





basic layout for which is shown in *Figure 8*, will be equipped with both high and low benches, air-driven high and low speed cutting instruments, microscopes, polygraphs, casting machine, prosthetic units, pH meter, fume hood, incubator and other equipment necessary to the total instructional program. It is hoped that some meaningful correlation of teaching material will result by use of these combined facilities. Further, they may be used with the horizontal, diagonal or vertical approach to dental teaching. Proper scheduling will allow the freshman laboratories to be used by

junior and senior students for applied basic science instruction when the first-year students are in gross anatomy or in the clinics. It is estimated that the room usage rate in these laboratories will be 70-75%. Each laboratory is laid out so that the instructor and/or CCTV is in the center with the students' desks arranged in rows. Jointly used equipment items will be located on the periphery to minimize traffic patterns across the laboratory. Because the entire academic schedule is closely tied to the clinic schedule, four lecture halls are needed



TYPICAL

MULTIDISCIPLINE

LABORATORY

FIGURE 8



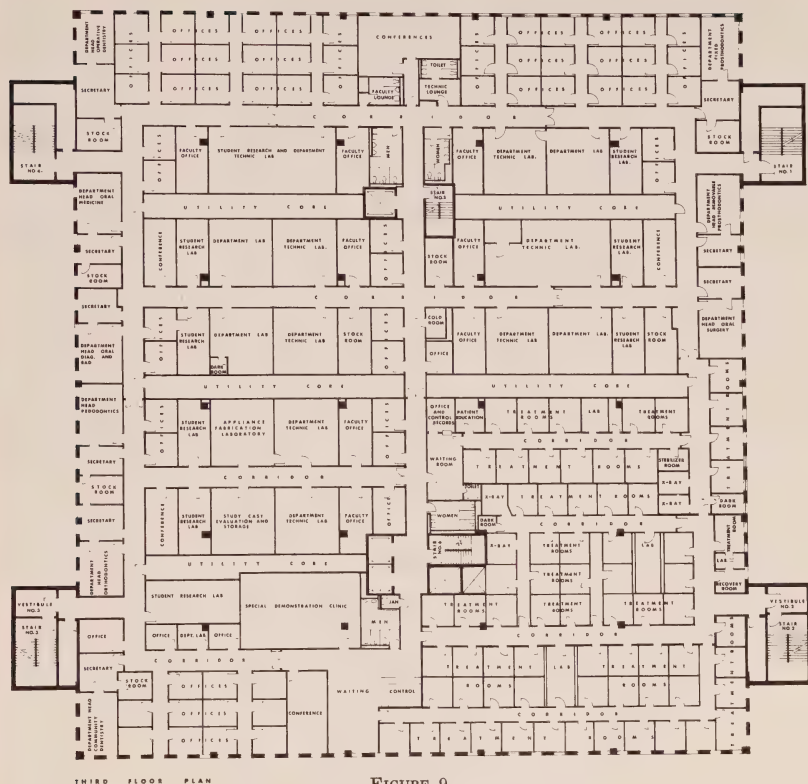


FIGURE 9

to allow simultaneous lectures to all four classes. Seminar rooms are available also so that any instructor may take up to 32 students from the laboratory for small group discussions. Central laboratory services is located in the center of the second floor and will service the multidiscipline laboratories. This facility will house spaces for tissue preparation, reagent preparation and storage, media preparation, glassware washing and sterilization, electronic shops, animal

holding rooms, etc. Personnel in central laboratory services will be responsible for setting up the laboratories for each session as ordered by the faculty responsible for the session, thus conserving a great deal of faculty time. An additional advantage of the central laboratory services concept is that its personnel may be quite useful in supplementing the research program, e.g., a study may require microscopic evaluation, but it is not extensive enough to



justify a full-time technician. Central laboratory services personnel can prepare such material.

*Third Floor.* Faculty office and laboratory space for clinical departments, a specialty clinic and a faculty group practice clinic are the main facilities on this floor (Fig 9). It is planned to furnish each department with sufficient space to allow each full-time faculty member a private office. In addition, laboratory spaces will be available to each department for its research activities, preparation of teaching material, faculty review of technical procedures and undergraduate student research. The specialty clinic area is shown in *Figure 10* and consists of 55 treatment rooms which will serve as dental operatories for

specialty treatment of patients referred from the other clinics. These spaces will be utilized by both undergraduate and postgraduate students through the patient referral system. Patient access to this floor will be by two highspeed passenger elevators which are located near the waiting room area. The faculty group practice clinic will consist of 15 treatment rooms, 2 x-ray rooms and other supporting space. Undergraduates will receive preceptor-type training in this area and will have the opportunity to see a group practice in operation.

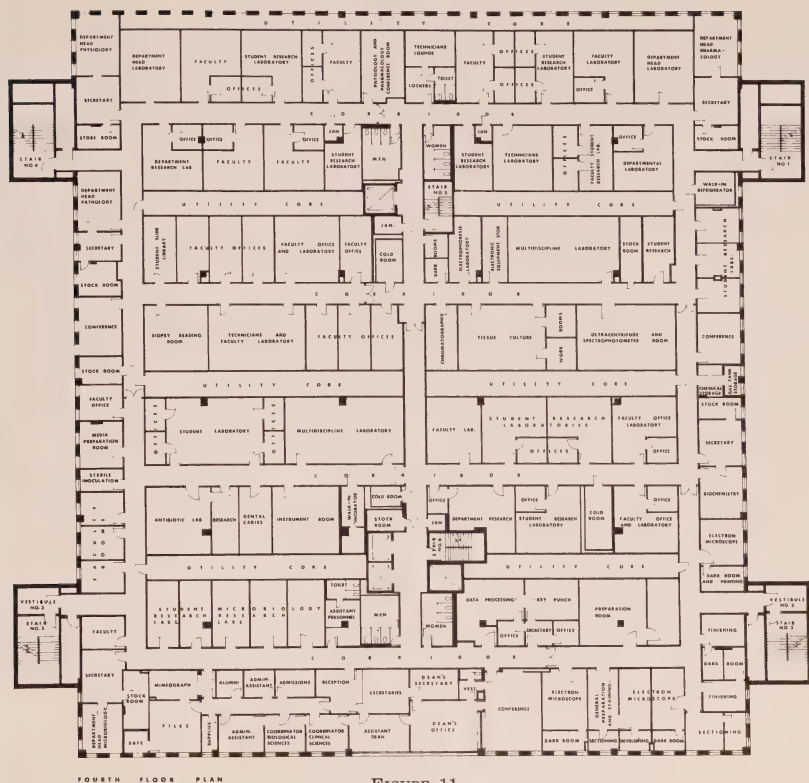
*Fourth Floor.* The basic science faculty, research facilities and administrative offices are on the fourth floor (Fig 11). It will be noted that the inner core of this floor (as well as a portion of the



SPECIALTY CLINICS

FIGURE 10





third and fifth floors) has a number of corridor-like spaces labelled as utility cores. These spaces are arranged so that all laboratory areas and some office space back up to them. These cores will contain all of the utility services required by a functioning laboratory area. The utility core concept will make it possible to convert adjacent office space to laboratory space at minimal cost since the extension of water, electricity, gas, air, fume hood exhaust, etc., can be carried out directly from the core. Likewise, because there are no weight-bearing walls,

office and/or laboratory size and shape can be readily altered. Two sets of laboratory-office facilities backing up to a utility core are shown in *Figure 12*.

Two multidiscipline laboratories, one high bench and one low bench, are located on this floor to house elective and graduate courses. The electron microscopy area represents an important teaching and research facility. It is laid out to accommodate four microscopes, one of which will be used for preparation of instructional material for the undergraduate programs in molecular biology,



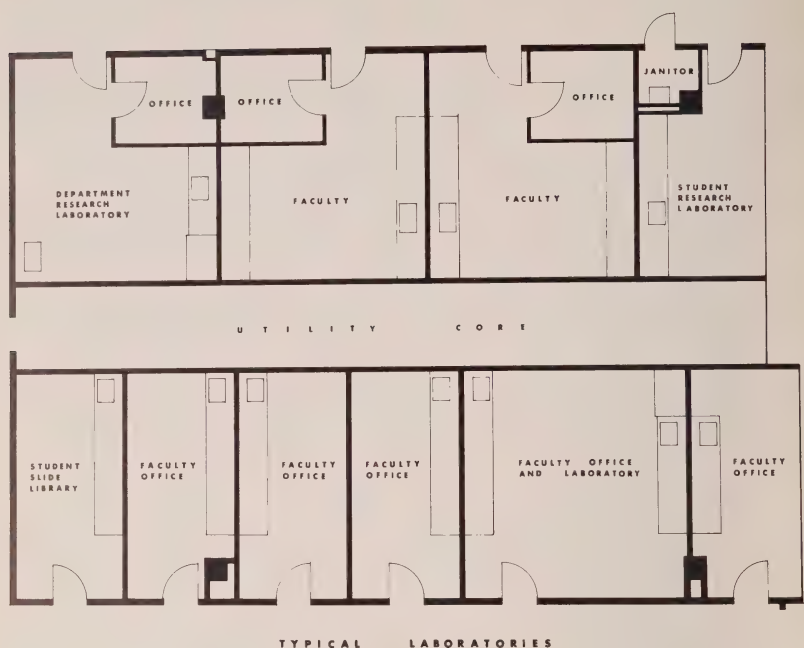


FIGURE 12

histology, embryology, dental materials, microbiology and pathology. Similarly, spaces designated for use as special facilities, such as tissue culture laboratory, electrophoresis laboratory and ultracentrifuge laboratory, will be used in the teaching program as well as for research. The administrative space grouping will include a conference room and all necessary office space for the dean, assistant deans and other administrative personnel. Directly across the hallway is a biostatistics section. This space will house key punch and card sorting equipment to be used in the

evaluation of student progress. It will also be used in the development of research projects and is, therefore, located near both administration and research areas. Eventually, this facility will be connected to the Health Sciences Computer Center in Howard Hall.

*Fifth Floor.* Because they require 100% exchange of air, the anatomy dissection laboratories and animal quarters are located on the fifth floor (Fig. 13). It will be noted that there are eight 16-student dissection rooms with four tables each. Faculty space for the Department of Anatomy is located on this floor also.



Animal quarters are complete and consist of isolation rooms, pen rooms, operating rooms, diet preparation, cage washing and sterilization rooms. The animal facility will be managed in a manner similar to central laboratory services and will be open to all faculty and students through arrangement with the director. A radioisotope laboratory is located adjacent to the animal areas to facilitate

maintenance and minimize movement of "hot" animals. The fifth floor is not a complete floor, and therefore can be expanded out to the south wall at minimal cost for construction. The roof on the north side of this floor will have a cooling tower and runways for dogs, and therefore will not be used for expansion.

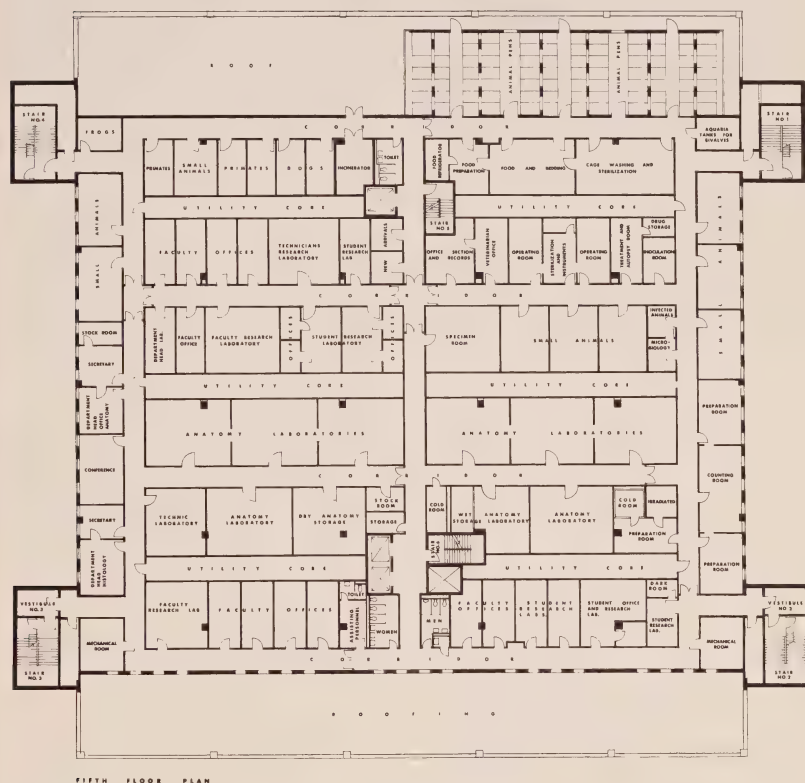


FIGURE 13



Wherever possible the Dental Health Center building is laid out to take full advantage of assignable space and to promote efficient flow of traffic. Combining of facilities has been done whenever feasible to promote the most efficient use of space. At the same time every effort has been made to incorporate flexibility to meet changing needs. Perhaps, it is the factor of change and the need to insure its orderly progression which has been the *prima fascia* force in both the program and physical facility designs described in this presentation and the earlier one in 1966. A university community of scholars and particularly a health science faculty can do no less, especially when one considers

that basic and applied knowledge in the natural sciences undergoes renewal in each ten year segment of time. Dr. Wilson H. Elkins, President of the University of Maryland, described this responsibility of the university community in his 1968 annual report to the Governor and General Assembly of Maryland, as follows:

"With change as the hallmark of our society, change must be a way of life for the University. The academic programs of an earlier generation can no more prepare students, at whatever level, for the problems of today than can the technology of an earlier decade meet the present needs of industry. The University does not discard the past, but seeks to impart what is relevant and true while pursuing and imparting new knowledge to cope more effectively with the present and to shape more rationally the future."



# The Mathematics of Bacterial Growth

by

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- I. *Introduction*
- II. *Growth Phases and Growth Constants*  
*Division Rates and Growth Rates*  
*Growth Phases*
- III. *The Physiological Significance of the Growth Constants*
- IV. *Concluding Remarks*

## I. INTRODUCTION

The material in this paper will be concerned primarily with the review of the mathematical interpretations of the bacterial growth. In spite of the fact that many complicated changes occur during the course of bacterial growth, cellular development and reproduction seem to take place quite regularly and in a rather orderly fashion. Unfortunately, as with many systems that are subjects of common knowledge, much of the information on growth is at the impression stage and lacks the precision necessary as a basis for further work. It is the intention of this review to clarify some of the studies that have been carried out on a bacterial growth and hopefully help a beginning graduate student of microbiology to better understand the interpretation of the bacterial growth from a mathematical point of view.

For our purpose, growth may be defined as the addition of new substance to individual cells or organisms, or the ability of a system to reproduce itself.

Therefore, growth may occur either in size or in numbers. A decrease in size or in quantity of substance of an organism has been referred to as negative growth. Positive growth is the addition of new substance at a greater rate than the loss of substance by catabolic metabolism, and it is in this sense that the term growth is generally used. Growth may involve the mere movement of materials into organisms and their incorporation per se as a part of the protoplasm as with water and mineral salts. It may also be a chemical transformation into new compounds as with the conversion of amino acids to proteins. Thus, one may conclude that growth is the sum of all the processes of catabolism and anabolism.

Although, the addition of new substance takes place in an organism, the growth of an organism, however, does not go on indefinitely. The growth of an individual ceases at a characteristic size and with bacteria the individual divides. The mere fact that the resulting organisms can in turn grow and divide in the same environment suggests that the original organism must have ceased growing as an individual not because of a limitation of environment but rather due to some internal or hereditary limitation (Lamanna and Mallette, 1965). As pointed out by Gunsalus (1951) in studying microorganisms, one must clearly



differentiate between the growth of the individual cell and the growth of the culture (an increase in population). The early studies of bacterial growth were based on the plate count which measured the number of viable cells. This involved two assumptions: (a) all offsprings are viable and (b) the cells are of uniform size. The first assumption is sufficiently true not to introduce serious error provided homogeneous populations only are considered. However, based on the work of Henrici (1928) the average size of the cell may vary considerably from one phase to another of a growth cycle.

Time is an important variable in the study of growth and the rate of growth. Therefore, the factors that affect the rate of growth require accurate description. It is also important to know the conditions under which growth will be initiated and to predict its duration. Many properties of growing cultures are common to all organisms and as such present generalized functions often reducible to mathematical description. In determining the rate, and to a lesser extent, the initiation and the limits of growth, temperature is an important variable. The most commonly found limiting factors of growth, as a rule, can be classified in one of the following groups: (a) exhaustion of nutrient; (b) accumulation of toxic metabolic products; and (c) changes in ion equilibrium, especially pH.

## II. GROWTH PHASES AND GROWTH CONSTANTS

A. *Division Rates and Growth Rates.* A quantitative expression of biological change is frequently reducible to a general mathematical description and may serve as a basis for predicting the response to a given set of conditions.

Since bacteria multiply by binary fission, the increase in population of a unit volume of a growing culture at time  $t_0$  containing  $x_0$  of cell may be expressed as  $X = X_0 \cdot 2^n$ . After all the cells have divided once. After  $n$  divisions it will be  $X = X_0 \cdot 2^n$ . The number of generations can be readily evaluated by expressing the above equation in logarithmic form. Using logarithms to the base 10, this equation becomes:

$$\text{Log } X = \text{Log } X_0 + n \text{ Log } 2$$

$$\text{or } n = \frac{\text{Log } X - \text{Log } X_0}{\text{Log } 2} = 3.32 (\text{Log } X - \text{Log } X_0) \quad [1]$$

The multiplication rate  $r$ , or the number of generations per unit time, can be obtained for the above equation by dividing by the time interval between inoculation,  $t_0$  and the time at which the final population  $X$ , was taken, i.e.,  $t_2$ . Therefore the multiplication rate  $r$ , is

$$\text{or } r = 3.32 \frac{(\text{Log } X - \text{Log } X_0)}{t_2 - t_0} \quad [2]$$

In defining  $r$ , the increase in cell concentration has been considered. When the average size of the cell does not change in the time interval considered, the increase in bacterial density (dry wt of cell per unit volume) is proportional to the increase in cell concentration. However, as established by the work of Henrici (1928), the average size of the cells may vary considerably from one phase to another of a growth cycle. It, therefore follows that the two variables,



cell concentration and bacterial density, are not equivalent.

Although the two variables are not equivalent, it is convenient to express growth rates in the same units (i.e., number of doublings per unit time) in both cases. It is equivalent to the true division rate when cell concentrations have been estimated. However, when bacterial density is considered, it expresses the number of doublings of bacterial density per unit time or the division rate of cells postulated to be of constant average size.

The above definitions given by Monod (1949) involve the assumption that in a growing culture all the bacteria are

viable, i.e., capable of division or at least that only an insignificant fraction of the cells are not capable of giving rise to a clone. This assumption is good provided only homogeneous populations are considered.

*B. Growth Phases.* In the growth of a bacterial culture, Monod (1949) lists six phases characterized by variation of the growth rate. Porter (1947) lists seven phases in the growth cycle using the subdivisions suggested by Buchanan (1918) and Wilson and Miles (1955) divide the growth curve into four phases. These three suggested divisions of the growth curve are given in Table 1 with the divisions suggested by Monod (1949) illustrated in *Figure 1*.

TABLE 1. PHASES OF GROWTH OF THE BACTERIAL GROWTH CURVE

| Phases of Growth      |                             |                       | Generation Time                      | Growth Rate |
|-----------------------|-----------------------------|-----------------------|--------------------------------------|-------------|
| Monod (1949)          | Porter (1946)               | Wilson & Miles (1955) |                                      |             |
| 1. Lag phase          | Latent or stationary phase  | Lag phase             | Very long                            | Null        |
| 2. Acceleration phase | Lag phase                   |                       | Decreasing                           | Increasing  |
| 3. Exponential phase  | Logarithmic growth phase    | Logarithmic phase     | Minimal and constant                 | Constant    |
| 4. Retardation phase  | Negative acceleration phase |                       | Increasing                           | Decreasing  |
| 5. Stationary phase   | Stationary phase            | Stationary phase      | Multiplication balanced by death     | Null        |
| 6. Phase of decline   | Accelerated death phase     | Phase of decline      | Multiplication overbalanced by death | Negative    |
| 7.                    | Logarithmic death phase     |                       |                                      |             |



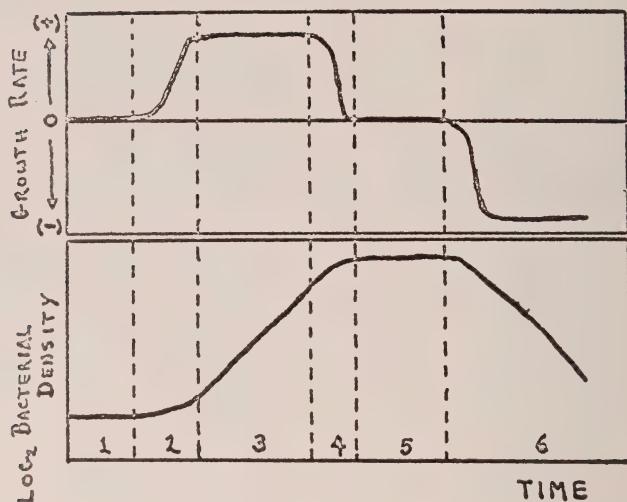


FIG. 1. BACTERIAL GROWTH PHASES.

Lower Curve: Log bacterial density.  
 Upper Curve: Variations of growth rate.  
 Vertical dotted lines mark the limits of phases.  
 (Monod, 1949).

Earlier workers considered the lag phase as a period of rest; however, it is now known that this phase is a period of intense growth activity during which cell enlargement but little or no cell division occurs.

Evidence of growth without multiplication during the lag phase has been shown by an increase in cell size. Henrici (1928) found in a culture of *B. megaterium* that the average length of the original cells was 3 to 4 $\mu$ , but that during the phase of maximum multiplication the average length of the organisms was about 15 $\mu$ . When this phase was over, the average length decreased in 10 hours

until it approximated that of the organisms used for the original seeding.

Other evidence of growth without multiplication during the lag phase include: (1) an increase in the respiratory activity of the cells, (2) an increase in susceptibility to disinfectants and (3) a decrease in susceptibility to non-specific agglutination.

The logarithmic phase is the period when the cells are dividing regularly and at maximum speed. It was generally believed that during this phase all the cells were alive and actively dividing. It has been found however, that the total cell count and the viable cell count are



not identical. The most probable explanation of this fact is that during this period of maximum growth, some of the organisms generated fail to survive (Wilson and Miles, 1955). If for example, we assume that 80 per cent of the bacteria produced during a given generation survive and continue to divide while 20 per cent die, then at the end of the logarithmic phase of growth, the total number of organisms alive and dead will exceed the number of living. The living bacteria would still increase by geometrical progression, and the curve obtained by plotting the logarithms of the numbers against time would still fall along an ascending straight line. The difference would be, however, in the number of bacteria. Instead of the number of bacteria being doubled in each generation, their factor of increase would be 1.6. This factor is sometimes called the generation index (Wilson and Miles, 1955). The generation index can be obtained with some degree of accuracy near the end of the logarithmic phase of growth if the viable and total counts are known both at the beginning and at the end of the  $n$ 'th generation.

$$\frac{V_n - V_o}{T_n - T_o} = i - 1 \quad [3]$$

$$\text{or } i = \frac{V_n - V_o}{T_n - T_o} + 1 \quad [4]$$

where  $i$  = the generation index  
 $V_o$  and  $T_o$  = the number of viable and total bacteria respectively at the beginning of the experiment.

$V_n$  and  $T_n$  = the number of viable and total organisms, respectively at the end of the  $n$ 'th generation.

Therefore, if there is a normal death rate during the logarithmic period of growth and a generation index of 1.6 is used rather than 2, then the equation for calculating the number of generations and the generation time would have to be altered to:

$$n = \frac{\text{Log } X - \text{Log } X_o}{\text{Log } 1.6} \quad [5]$$

The rate of cellular division, which was at a maximum during the logarithmic phase decreases until there is an apparent equilibrium between the cells that are dying and those that are being newly formed. This equilibrium is known as the stationary phase. The exhaustion of nutrients, either potential or actual, and the accumulation of toxic materials together or singly halt the growth of a culture. Changes in pH and oxidation-reduction potential to levels not conducive to continued growth frequently accounts for the passing of the exponential phase of growth.

With any fluid culture, the total yield of bacteria per unit volume of medium tends to be constant for a given species. Bail (1929) has labeled this population of bacteria "the M-concentration" and gives the following proof for his claim:

1. With a large inoculum, the M-concentration is reached much earlier than with a small inoculum.

2. Living bacteria introduced into fresh broth in M-concentration are unable to multiply.



3. Living bacteria introduced into fresh broth in a concentration greater than M die off until the M-concentration is reached.

4. If a culture that has reached its M-concentration is centrifuged and then re-incubated, fresh growth will occur in the clear supernatant fluid till the M-concentration is reached again.

There is considerable evidence in favor of some of Bail's claims concerning space theory and M-concentration, but many of his points are not accepted at this time. The maximum number of viable organisms in a culture is generally reached during this phase. The time taken to attain it varies with several factors such as the nature of the organisms, the composition of the medium and the temperature of incubation. However, before any definite conclusions can be reached, further work will have to be done on the subject of why bacteria stop dividing at a maximum speed when a certain population is reached.

The stationary phase, after lasting from about an hour to several days, gradually passes into the phase of decline. The cause of death after the period of active growth of a culture may be related to the nature and concentration of the limiting factors responsible for the cessation of growth (Lamanna and Mallette, 1965). It is possible that growth is not entirely in abeyance during this stage, for if counts are performed at daily intervals, spasmodic rises are sometimes noticed, indicative of the production of new organisms (Wilson and Miles, 1955).

In the study of death of bacteria, several different theories have been formulated to explain the general curve obtained by plotting the number of surviving organisms against time. The

theory of natural selection attributes the form of the mortality curve to biological differences in the resistance of the individual bacterial cells.

Other workers studying the action of heat, chemical disinfectants, and other unfavorable influences on the death of bacteria, have given a somewhat different interpretation to the mortality curve. Chick (1908) and Cohen (1922) presented data that, when plotted in logarithmic form, showed a close agreement to the curve of a monomolecular chemical reaction and proposed a theory of logarithmic death.

Thus, according to this theory, if the logarithms of the number of surviving bacteria after various lengths of time are plotted against time, the points will be found to lie on a straight line. The slope of the line will be a negative value and is termed the velocity coefficient of the reaction. The formula for the rate of decrease is, in the form used by Buchanan (1918) as follows:

$$\text{Log } B/b = Rt \quad \text{or} \quad -R = 1/t \text{ Log } b/B$$

$$\text{and } R = 1/t \text{ Log } B/b \quad [6]$$

where  $R$  = the velocity constant

$t$  = the interval of time between successive observations

$B$  = the number of bacteria initially present

$b$  = the number present at the end of time

C. *Growth Constants.* According to Monod (1949), the growth of a bacterial culture can largely, if not com-



pletely, be characterized by three fundamental growth constants which he defines as follows:

Total growth: the difference between initial ( $X_0$ ) and maximum ( $X_{max}$ ) bacterial density:

$$G = X_{max} - X_0 \quad [7]$$

Exponential growth rate: growth rate during the exponential phase (R). It is given by the expression.

$$R = 3.32 \frac{(\log X - \log X_0)}{t_2 - t_0} \quad [2]$$

when  $t_2 - t_0$  is any time interval within the exponential phase.

Lag time and growth Lag: Lag time may be defined as the difference between the observed time ( $t_r$ ) when the culture reaches a certain density ( $X_r$ ) chosen within the exponential phase and the "ideal" time at which the same density would have been reached ( $t_i$ ) had the culture grown without any lag.

$$T_l = t_r - t_i$$

$$\text{or } T_l = t_r - \frac{\log_2 X_r - \log_2 X_0}{R} \quad [8]$$

The constant thus defined is significant only when cultures having the same exponential rate are compared. A more general definition of a lag constant should be based on physiological rather than an absolute time. For this purpose, another constant is proposed, which

Monod (1949) called growth lag (L) and is defined as  $L = T_l \cdot R$  [9] where L is the difference in number of divisions between observed and ideal growth during the exponential phase.  $T_l$  and L value are determined graphically from Figure 2.

### III. THE PHYSIOLOGICAL SIGNIFICANCE OF THE GROWTH CONSTANTS

The metabolic activity of bacterial cells modifies the composition of the medium in which they grow (Monod, 1949). Depending on the initial culture conditions and on the properties of the bacterial cells, one or several of these changes will eventually result in a decrease of the growth rate. This brings the exponential growth phase to an end and leads more or less to the complete cessation of growth.

The factors most commonly found to be limiting can, as a rule be classified in one of the following groups: (a) exhaustion of nutrients; (b) accumulation of toxic metabolic products; and (c) change in ion equilibrium.

The physiological significance of the constant G (total growth) depends on the nature of the limiting factor (Monod, 1949). It can not be interpreted when the limiting factor is unknown or when several factors cooperate in limiting growth. The estimation of total growth is very useful when the growth-limiting factor is a single, known essential nutrient. By definition, any one of the essential nutritional requirements of an organism is a potential limiting factor. For organisms capable of growing on simple defined media, the composition of the medium can easily be adjusted so that the concentration of all essential



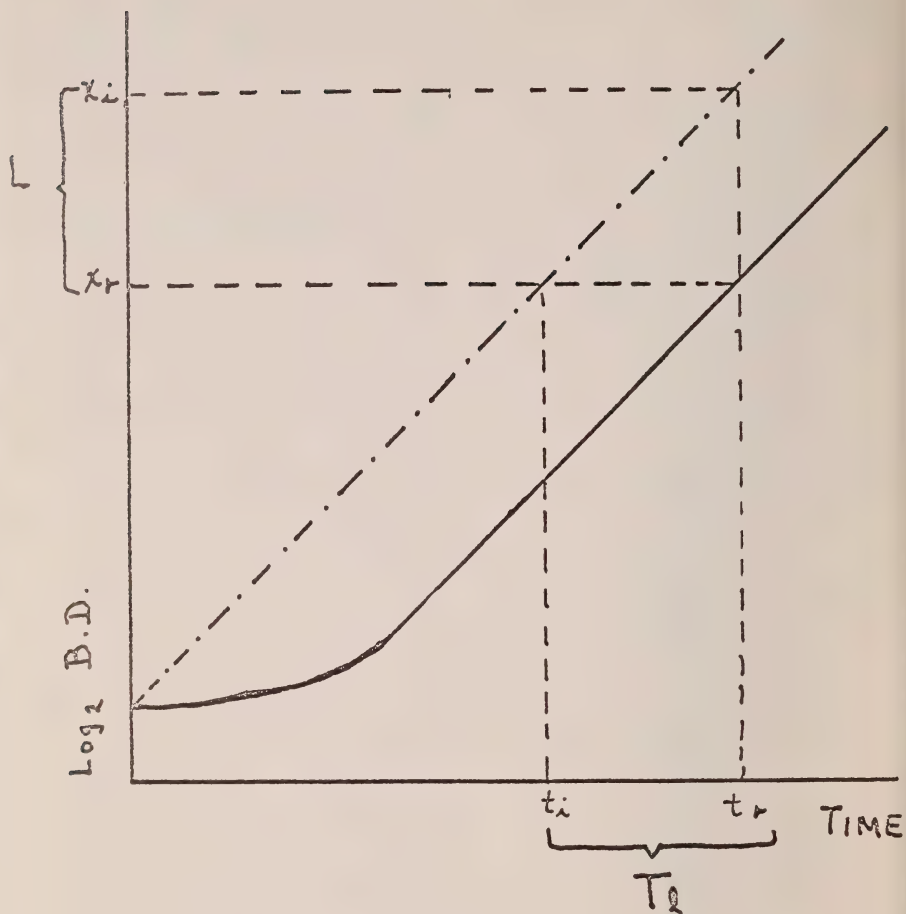


FIG. 2. LAG TIME AND GROWTH LAG.

Solid line = observed growth. Dotted line = "ideal growth" (without lag).  $T_l$  = lag time.  $L$  = growth lag (Monod, 1949).



nutrients are in excess, except one which then becomes the limiting factor.

A theoretical discussion of bacterial growth usually starts from the growth equation:

$$1/x \cdot dx/dt = d(\log_e x)/dt = \mu = \log_e 2/t_d. \quad [10]$$

Where  $x$  is the concentration of organisms (dry weight of organisms/unit volume) at time  $t$ ,  $\mu$  is the specific growth rate (the actual rate of increase of concentration of organisms ( $dx/dt$ ) is called the growth rate. The rate of increase/unit of organism concentration

$\left(1/x \cdot \frac{dx}{dt}\right)$  is called the specific

growth rate) and  $t_d$  is the doubling time (Herbert, *et al*, 1956). In the above equation  $\mu$  and  $t_d$  are assumed to be constants, however this assumption is correct only when all substrates necessary for growth are present in excess (Herbert, *et al*, 1956).

Monod (1949) was the first to show that there is a simple relationship between the specific growth rate and the concentration of an essential growth nutrient. The value of  $\mu$  is proportional to the nutrient concentration when this is low but reaches a limiting saturation value at high nutrient concentration according to the equation:

$$\mu = \mu_m \left( \frac{s}{K_s + s} \right) \quad [11]$$

$s$  is the nutrient concentration,  $\mu_m$  is the growth rate constant (i.e., the maximum value of  $\mu$  at saturation level of

nutrient) and  $K_s$  is a saturation constant numerically equal to the substrate concentration at which  $\mu = \frac{1}{2} \mu_m$ . From the above equation, it can be seen that exponential growth can occur at specific growth rates having any value between zero and  $\mu_m$ , provided the substrate concentration can be maintained at the appropriate value. This fact is of major importance in continuous culture.

The relationship between growth and utilization of substrate has also been shown by Monod (1949). This is shown in simple form in growth medium containing a single organic substrate. Under these conditions the growth rate is a constant fraction,  $Y$ , of the substrate utilization rate:

$$dx/dt = -Y ds/dt \quad [12]$$

where  $Y$  is the yield constant. Therefore, over any finite period of growth:

$$Y = \frac{\text{wt of bacteria formed}}{\text{wt of substrate used}} \quad [13]$$

When the three growth constants  $\mu_m$ ,  $K_s$  and  $Y$  are known, equations [10] to [13] provide a complete quantitative description of the growth cycle of a batch culture. These same equations and constants are equally applicable to the theoretical treatment of continuous culture (Herbert, *et al*, 1956).

The essential feature of continuous culture is that microbial growth takes place under steady state conditions. The variables within the control of the experimenter are the substrate concentration and the flow rate of the incoming culture medium. In considering bacteria growing in a completely-mixed type of continuous culture, the organisms



are growing at a rate described by equation [10] and simultaneously being washed away at a rate according to the equation:  $-dx/dt = Dx$ , where  $Dx$  is the wash out rate. The net rate of increase of the concentration of the organisms may be given by the simple balance equation:

$$\text{increase} = \text{growth} - \text{output}$$

$$\text{or } dx/dt = \mu x - Dx \quad [14]$$

It can be seen therefore that in a continuous culture if  $\mu > D$ ,  $dx/dt$  is positive and the concentration of organisms will increase, while if  $D > \mu$ ,  $dx/dt$  is negative and the concentration of organisms will decrease, eventually to zero. When  $\mu = D$ ,  $dx/dt = 0$  and  $X$  is constant; i.e., a steady state is established in which the concentration of organisms does not change with time (Herbert, *et al*, 1956).

Since  $\mu$  (the specific growth rate) depends on  $s$  (the substrate concentration), as is shown in equation [11], it is necessary to know what dilution rate makes a steady state possible or how dilution rate affects the concentration of substrate in the culture vessel. Herbert *et al* (1956) expressed the net rate of change of substrate by the following balance equation:

$$\text{increase} = \text{input} - \text{output} - \text{consumption}$$

$$= \text{input} - \text{output} - \frac{\text{growth}}{\text{yield constant}}$$

$$\text{or: } ds/dt = Ds_R - Ds - \mu x/Y \quad [15]$$

From equations [14] and [15] Herbert *et al* (1956) derived the following equa-

tions that completely define the behavior of a continuous culture in which the fundamental growth relations are given by equations [10] and [12].

From equation [10]

$$dx/dt = x \left[ \mu_m \left( \frac{s}{K_s + s} \right) - D \right] \quad [16]$$

and from equation [12]

$$ds/dt = D(s_R - s) - \frac{\mu_m x}{Y} \left( \frac{s}{K_s + s} \right) \quad [17]$$

After considering equations [16] and [17], it becomes apparent that if  $s_R$  (substrate concentration entering the culture vessel) and  $D$  (the dilution rate) are held constant and  $D$  does not exceed a certain critical value (the value at which complete wash-out occurs) then unique values of  $x$  and  $s$  exist for which both  $dx/dt$  and  $ds/dt$  are zero or the system is in a steady-state. Herbert *et al* (1956) in solving equations [16] and [17] for  $dx/dt = ds/dt = 0$ , derived the following equations for the steady-state values of  $x$  and  $s$  which were designated  $\bar{x}$  and  $\bar{s}$ .

$$\bar{s} = K_s \left( \frac{D}{\mu_m - D} \right) \quad [18]$$

$$\bar{x} = Y(s_R - \bar{s}) = Y \left[ s_R - K_s \left( \frac{D}{\mu_m - D} \right) \right] \quad [19]$$



From these equations, the concentration of bacteria and substrate in the culture vessel in a steady-state can be predicted for any value of the dilution rate and concentration of the inflowing substrate, provided the values of the growth constants  $\mu_m$ ,  $K_s$  and  $Y$  are known.

Pirt (1965), has reported that certain bacteria, when they grow, consume energy at a constant rate for cell maintenance of bacteria, as the energy consumed for functions other than production of new cell material. He attributes the variation, in the yield of organism from the substrate used as the energy source, to consumption of energy at a constant rate for cell maintenance.

The observed growth yield of organism,  $Y$ , is given by the equation:

$$Y = \frac{x}{s_G + s_M} \quad \text{where } x \text{ is the}$$

amount of organism produced,  $s_G$  is the energy substrate consumed for new cell synthesis and  $s_M$  is consumed for maintenance of the cells. If the maintenance energy was zero the above equation would reduce to  $Y_G = x/s_G$  and  $Y_G$  is termed the true growth yield. The overall rate of substrate utilization may then be defined as the rate of substrate utilization for maintenance plus the rate of substrate utilization for growth or

$$ds/dt = (ds/dt)_M + (ds/dt)_G \quad [20]$$

Defining growth rate in the usual way ( $dx/dt = \mu_x$ ), Pirt (1965) made the following substitutions in equation [20]:

$$\begin{aligned} ds/dt &= -\mu x/Y; \quad (ds/dt)_M = -mx; \\ (ds/dt)_G &= -\mu x/Y_G \end{aligned}$$

and derived the equation:

$$1/Y = m/\mu + 1/Y_G \quad [21]$$

where,  $m$ , is defined as the maintenance coefficient.

Herbert *et al* (1956) assumed that  $Y$  was constant and derived equation [19] for the steady-state value of the organism concentration ( $\bar{x}$ ) in a homogeneous continuous culture. From the fact that the observed yield ( $Y$ ) is dependent on the growth rate, Pirt (1965), substituting  $Y$  (from equation [21] in equation [19] derived the following equation for the steady-state value  $\bar{x}$  (the concentration of organisms)

$$\bar{x} = \frac{DY_G}{mY_G + D} \left[ S_R - K_s \left( \frac{D}{\mu_m - D} \right) \right] \quad [22]$$

When  $m$  is zero the expression reduces to the same as that given by the earlier theory of Herbert *et al* (1956) when  $Y = Y_G$ .

#### IV. CONCLUDING REMARKS

Various equations of the growth curve for bacterial cultures have been derived from numerous theories. It is possible with these equations to predict growth curves and to compare them with actual curves. There are equations, based on a number of different theories, that successfully predict actual growth curves. However, equations that give only a mere coincidence of numbers, are of no



theoretical use to the biologist unless the *modus operandi* of the biological phenomenon is depicted or suggested.

The sigmoid curve describes the growth curves of a bacterium, of a bacterial culture, and rate curves of numerous phenomena of physics, chemistry, biology and human society. However, the mere fact that the growth curve of a bacterial culture is of sigmoid shape

can not prove that growth is analogous to other phenomenon with the same type of curve of development.

As further advances are made toward a more integrated picture of cell physiology, theories of the growth curve and the derived equations for the determination of growth constants will have a much greater place in the experimental arsenal of microbiology.

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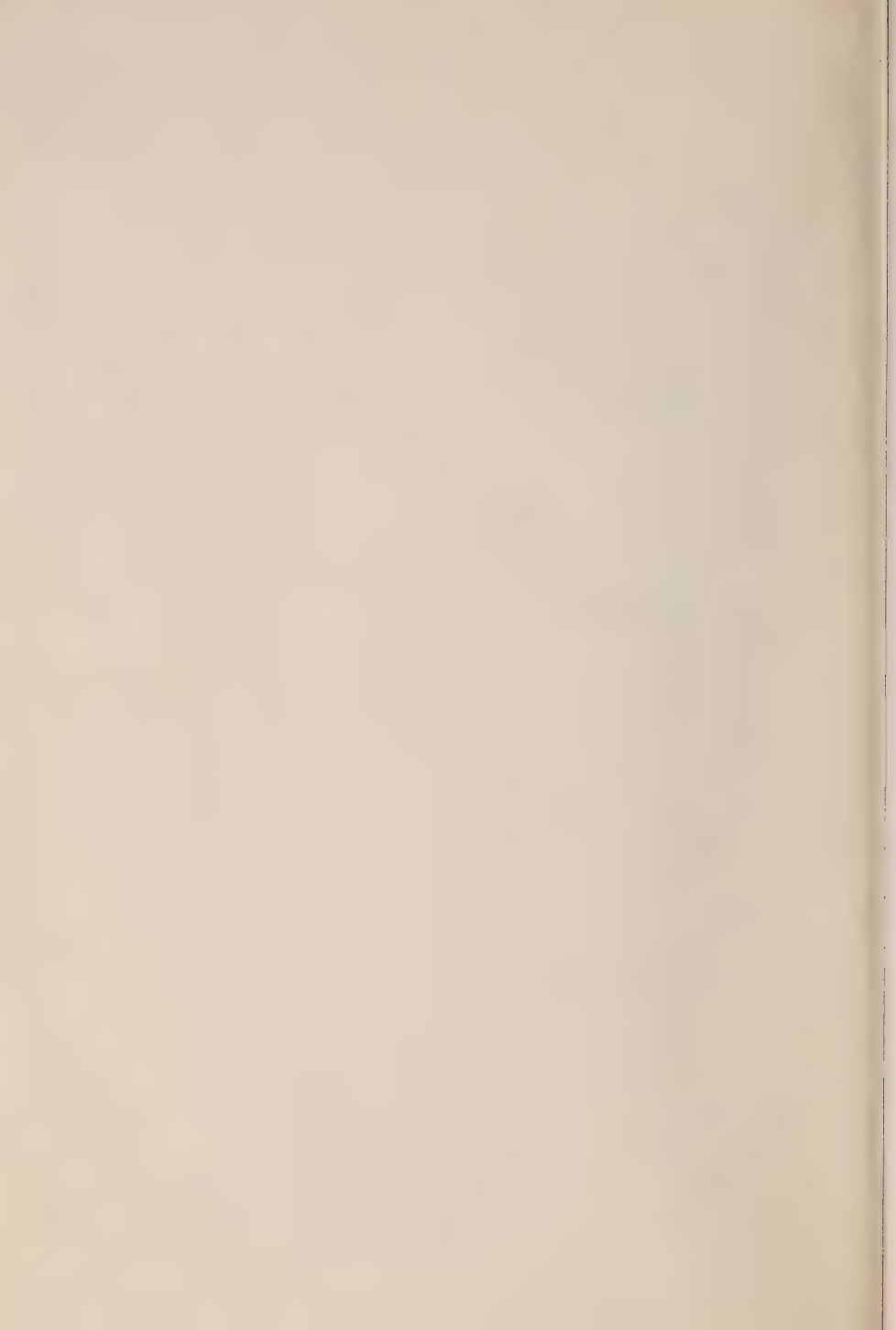








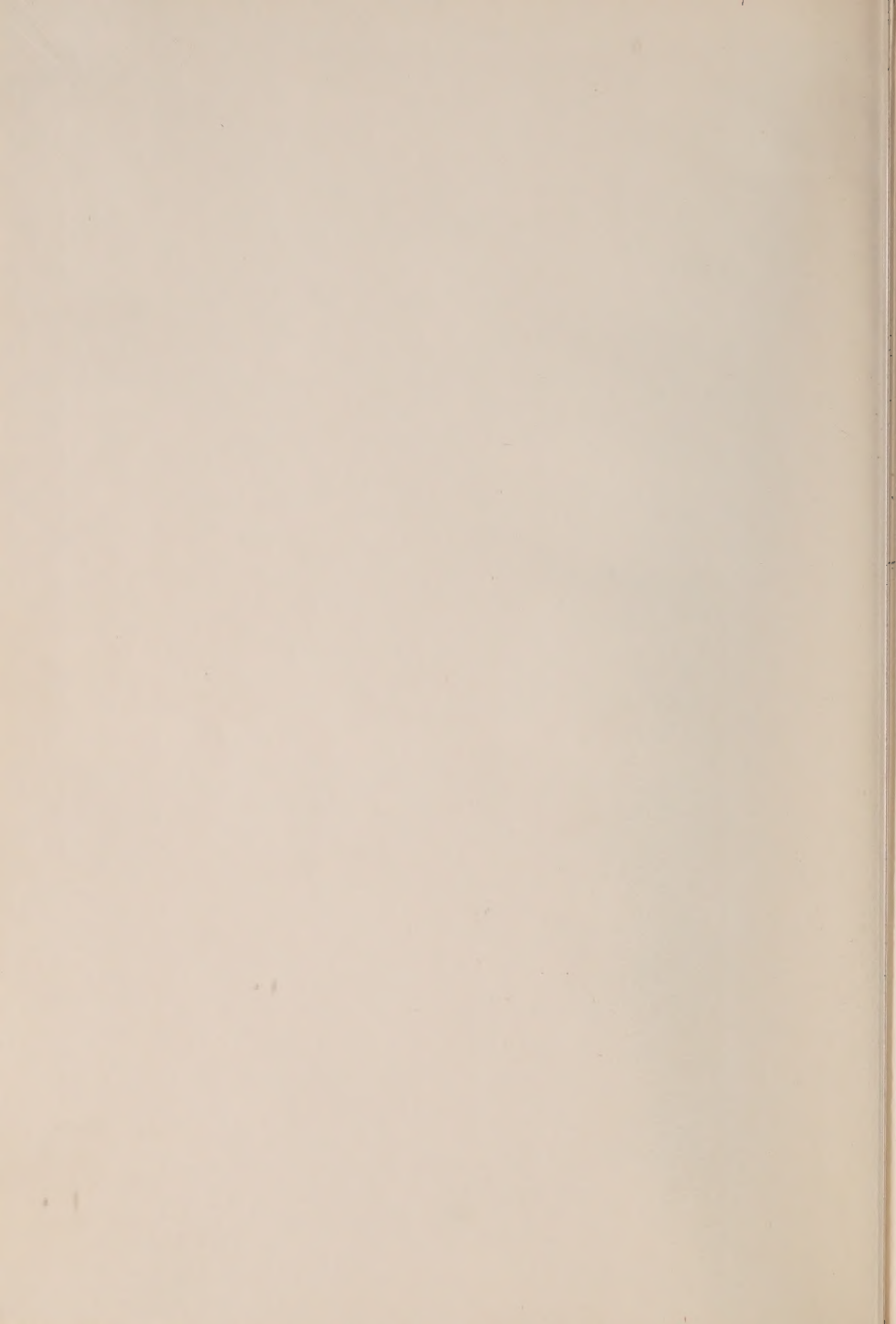














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